





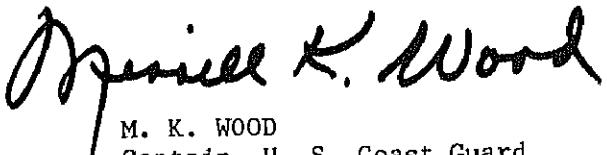
## FOREWORD

There are few places outside our halls of learning whether they be colleges, training centers or the Auxiliary training class where what is said or done by one man will affect the careers of so many people. The Auxiliary Instructor at any level of training from Basic Qualification to AUXOP leaves his mark on the people he instructs. With this responsibility in mind, the instructor must take every opportunity to improve himself not only in his chosen specialty, but also in the techniques of instruction.

Set forth in this manual are one of the essential areas of knowledge and procedure which will furnish Auxiliary Instructors with a basis on which to build. This manual is not to be considered as final in any respect. It is, however, a beginning, for the field of visual aids is vast. It is hoped that this manual will bring to Auxiliary Instructors some new ideas for this field of visual aids.

The Coast Guard and the Coast Guard Auxiliary are especially grateful to the U. S. Power Squadron for the use of their material in this ever growing field of Visual Training Aids.

The many hours that Ralph R. Hoffman, BC-TSA, and Frank L. Palmer, BC-EDT, spent in reviewing and selecting the visual aids for this manual are much appreciated. Without their help this manual would still be in the planning stage. To all those Auxiliarists who submitted ideas "thank you and keep up the good work." It is regretted that all the ideas submitted could not be used. Due to space limitations only a representative sample was selected.



M. K. WOOD  
Captain, U. S. Coast Guard  
Chief Director of the Auxiliary  
By direction of the Commandant

**AUXILIARY  
Visual Aids Manual**

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## GLOSSARY OF TERMS

Base Transparency - The main transparent sheet of a visual aid to which information is added by writing or by overlaying other transparencies.

Frame - A pre-cut cardboard frame for mounting transparencies. Frames aid in both the presentation of the visual aid and protection by providing a rigid support for the transparency.

Negative Transparency - An overhead projection transparency through which the image projects brighter than the background areas. It is available with either white or colored images on a dark background.

Original - The medium from which a transparency is reproduced - example- typewritten page, picture, photograph, printed sheet, etc.

Overlay - A transparency which is overlaid on another transparency to add related information to the visual aid. It is usually designed so the super-imposed information of the overlay is in register with information of the base transparency.

Reproduction - A general term referring to the method of transferring information from an original to a transparency.

Transparency - A medium for overhead projection which includes an image produced mechanically (infrared photo or wet photo) or manually (hand drawing silhouette, etc). It can be but is not necessarily a complete visual aid.

Visual Projection - One or more transparencies (as overlays) assembled to provide the total projected information desired or mounted to permit revealing information in a desired sequence.

Visual - Contraction for visual projection but using only one transparency.

Projectional - Another term for visual.

O/P - Abbreviation for Overhead Projector.

## PART I

### INTRODUCTION

Visual training aids have been defined in various ways. For purposes of discussion we shall define them as any aid which makes its appeal through the sense of sight. These include:

- A. Graphic Aids - flat pictures, posters, graphs, charts, diagrams, etc.
- B. Projected Aids - motion pictures, slides (for slide projector) and transparencies (for overhead projector).
- C. Mechanical/electrical aids - models, (enlarged, miniature working), actual objects, cutaways, mock-up sets, etc.

#### When to Use the Aid

When should an instructor use a visual aid? The best and most obvious reason would be - whenever it is necessary to:

- A. Teach more and save time.
- B. Hold student interest.
- C. Help the student to retain more.
- D. Provide a means of more accurate learning.

In short, whenever it is practical to use it.

If it is feasible, use the actual object, it is best for instruction purposes. If the object is too large, too small, too expensive or not available, a different type of visual aid is necessary.

No visual training should ever take the place of the instructor. Visual aids, when properly used, help the student learn. If they are misused the student may be more confused with it than without it.

The Auxiliary Instructor should ask himself, will this aid help my students learn more effectively? If the answer is "YES" then the visual aid should be used. The instructor must then select or construct one that meets the criteria for his class.

#### General

This manual suggests ways to approach the task of making a simple visual teaching aid, namely, visuals for the overhead projector. Using the information in this manual can help you the instructor and other Auxiliary instructors who follow you.

It will however, be up to you to enlarge and improve on the information presented. Use this information to fit your skill and you. No publication can effectively cover all of the knowledge available in the field of visual aids.

#### Planning the Visual Aids

The Auxiliary Instructor can do much to improve on an idea for a visual aid by careful planning and preparation prior to actual construction of the aid. Understand the subject of the aid before constructing it. Before constructing consider the time required to transport, set-up, use and return the aid to storage. Will the aid be cumbersome, complicated, electrical or mechanical? Consult with other instructors for further insight and a more

complete understanding of the aid as possible. Simplicity of the visual aid is essential.

Every Auxiliarist has a different level of experience with tools, construction methods and workshops. Aptitude is not always enough, therefore, be realistic in your plans about the work you can do in your own shop. Perhaps parts of the aid can be constructed by other members of the flotilla or division.

In seeking help from others, be specific in your request for help. If your request is specific other Auxiliarists will not be hesitant to say yes. Even the busiest, most active Auxiliarists will help if you are specific and your description is adequate. If you solicit professional services:

- A. Have clear drawings.
- B. Be specific.
- C. Understand what you need and why you need it.

Often a person with the professional skills you are seeking will offer alternate methods or materials in order to save you time and money. When asked questions on your aid, answer with assurance and conviction. If you can do this, you will find the people you contact for assistance more receptive and willing to help.

Now you are ready to complete the plans for the visual aid. Remember the details of how the aid works and how it is made. The plans are part of the complete visual aid.

#### Selecting the Materials for the Visual Aid

All visual aids need not be made of permanent materials and need not

be large enough for a class of 100 or more students. The average size of a class can be determined from local flotilla records. Construct the aid to fit the local flotilla need.

When selecting the materials to be used, consider the weight, strength, size, joining methods available and the finish treatment. Most people are less attentive when the aid is dirty (not used, but dirty). Construct the aid and finish it so that it is not difficult to keep clean. Remove as many rough or sharp edges as possible. No one likes snagged clothing or scratched hands.

Construct the visual aid so that it can be adapted and used by other instructors as well.

When purchasing the materials you will need, go to the supply house, whether it be a cabinet shop, lumber yard, photo supply store, sheet metal service company, machine shop or general retail store. It is also possible to purchase salvage material if you know what you can use, be specific in your request and knowledgeable about the aid you are constructing.

When computing the cost effectiveness of the aid, consider whether the aid is to be used extensively in the classroom, also, will it be used at boat shows, conventions, National Safe Boating Week? This will allow you to decide if the aid requires more cost and effort.

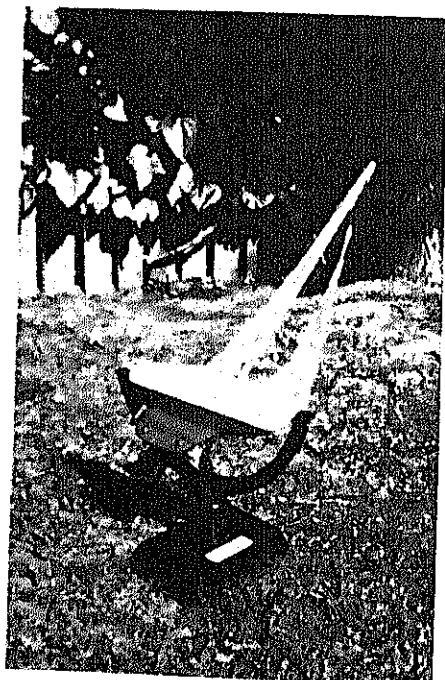
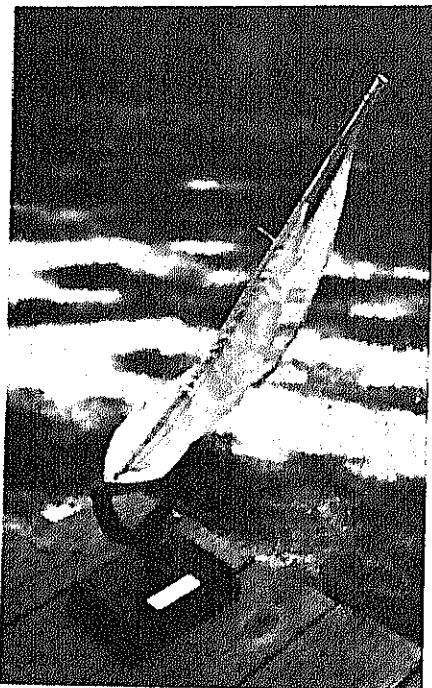
#### Methods and Ideas for the Instructor

At this point you should have talked to the FSO-PE, FSO-MT and other instructors about the specific visual aid you plan to make. Prepare good instruction for others before construction of the aid

is completed. Plans and instructions can be modified as work on the aid progresses but should not be changed after construction is completed.

There are many sources for ideas and new horizons to explore in visual training aids. Some may require effort on your part, such as writing a letter requesting information or spending a few hours in the public library. Trade magazines, hobby, sports and mechanical field publications contain a wealth of ideas. Hardware stores lumber yards and general retail stores have displays, brochures, etc. all which yield information. Collect some of these data in loose-leaf notebooks to be used as a memory bank for ideas and applications. Display booths at boat shows contain many ideas for visual aids. The following plans for visual aids are enclosed to stimulate the thoughts of Auxiliary Instructors. Many of the plans are by no means complete, but further information regarding the construction of the aid can be obtained by contacting the Auxiliarist responsible for submitting the original suggestion.

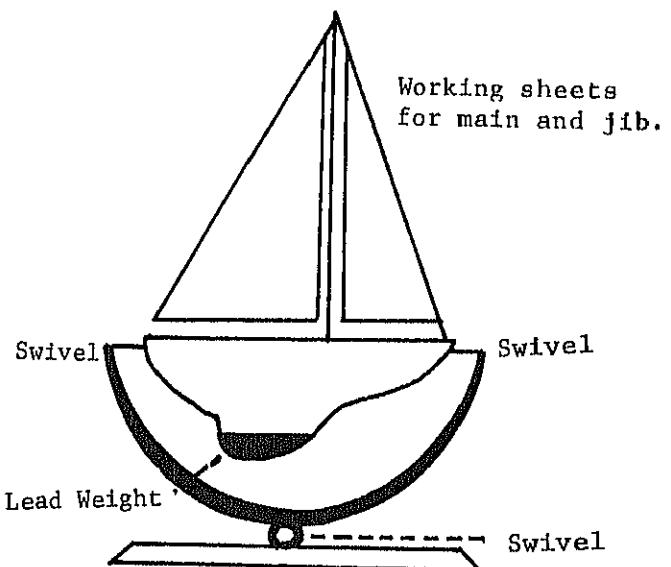
## SAILBOAT



Suggested Uses:

One Lesson  
Seven Lesson Sailing

Can be used with a fan.



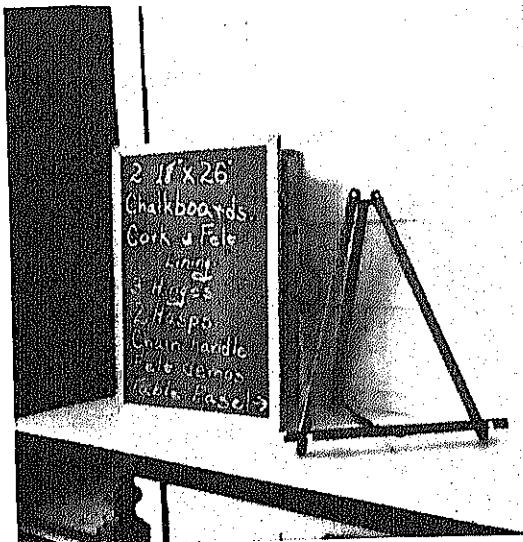
Construction:

Cloth sails  
Balsawood hull

Submitted by:

John Hanson  
Flotilla 41  
San Jose

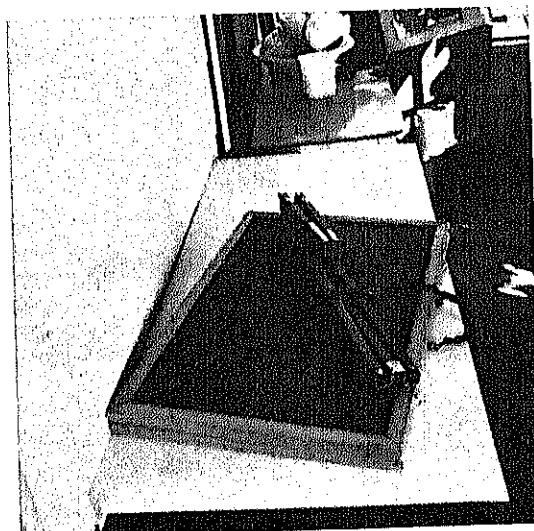
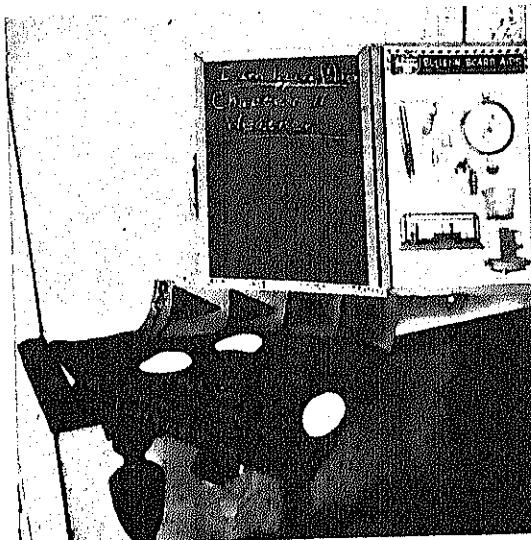
Cost: \$8.00 and much handwork.



#### FELT-LINED BLACKBOARD

##### Suggested uses:

Most courses where a visual demo can be used.  
All 12 chapters of the  
BS & S  
Sailing Classes



This training aid can be used indoors or outdoors, with paper or felt objects.

As felt will adhere to felt, little or no pinning is necessary. but if other material is used, plastic headed poster pins are used.

Chalk and eraser are needed for the blackboard side.

About \$15.00 will cover the initial materials. Accessories are added when needed.

##### Submitted by:

Laura Milam  
760 H Street  
Lincoln, CA

Flotilla 11-2

## MODEL BOAT

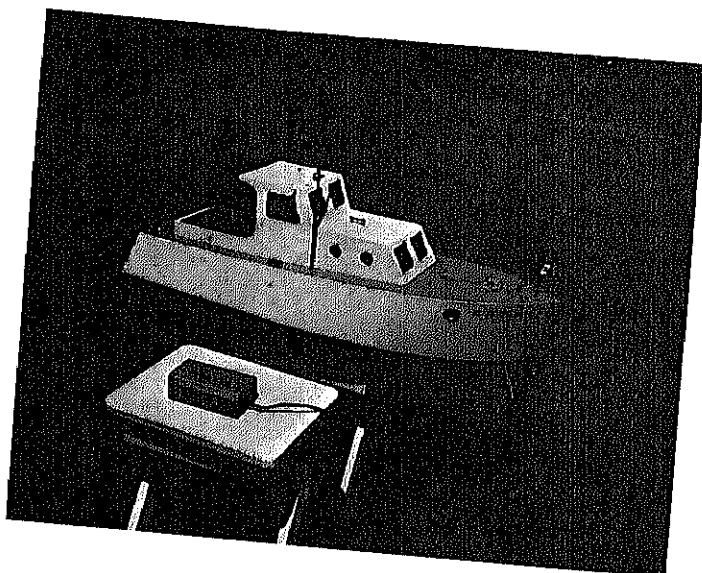
### Suggested Uses:

Sailors' Language  
Boat Handling  
Rules of the Road  
Legal Requirements

This model is 38" x 12" cabin cruiser built to an exact scale of 1" to 1'. It is complete with National Ensign and Coast Guard Auxiliary Flag. Lights include inland and international for all classes of vessels (A, 1, 2, 3) including towing lights for up to a 600 foot tow.

The lights are controlled by a switch console with a 6 foot extention cable. The horn and bell are electronically operated through the console. The complete ventilation system includes electrical blower and bilge pump.

An anchor with a chain and line is aboard. All fittings such as cowl vents, chocks and cleats are of solid bronze, hand made to an exact scale of 1" to 1'. A one inch working compass along with PFD's, ring buoys CF numbers and State license (exact scale) complete this vessel for use in classroom demonstrations.



Submitted by:

Hull: Walter Roch

Wiring:

Max Morrison  
Flotilla 61  
Morro Bay

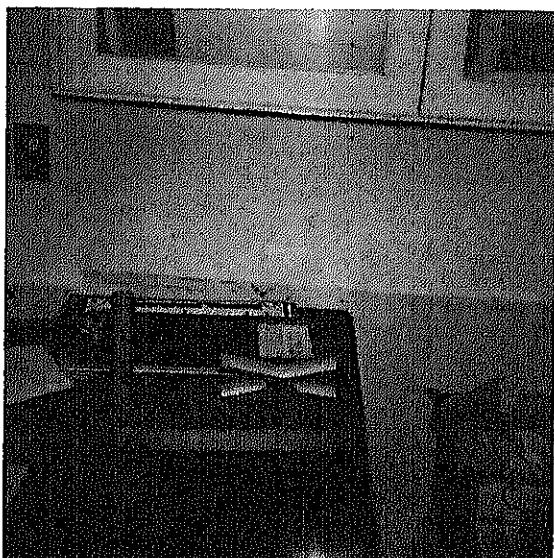
Cost: Hull \$5.00

Wiring, not submitted

CLEAT AND BOLLARD

Suggested uses:

Marlinspike  
Seamanship



Cleat and bollard are used to demonstrate the securing of a boat

Materials used:

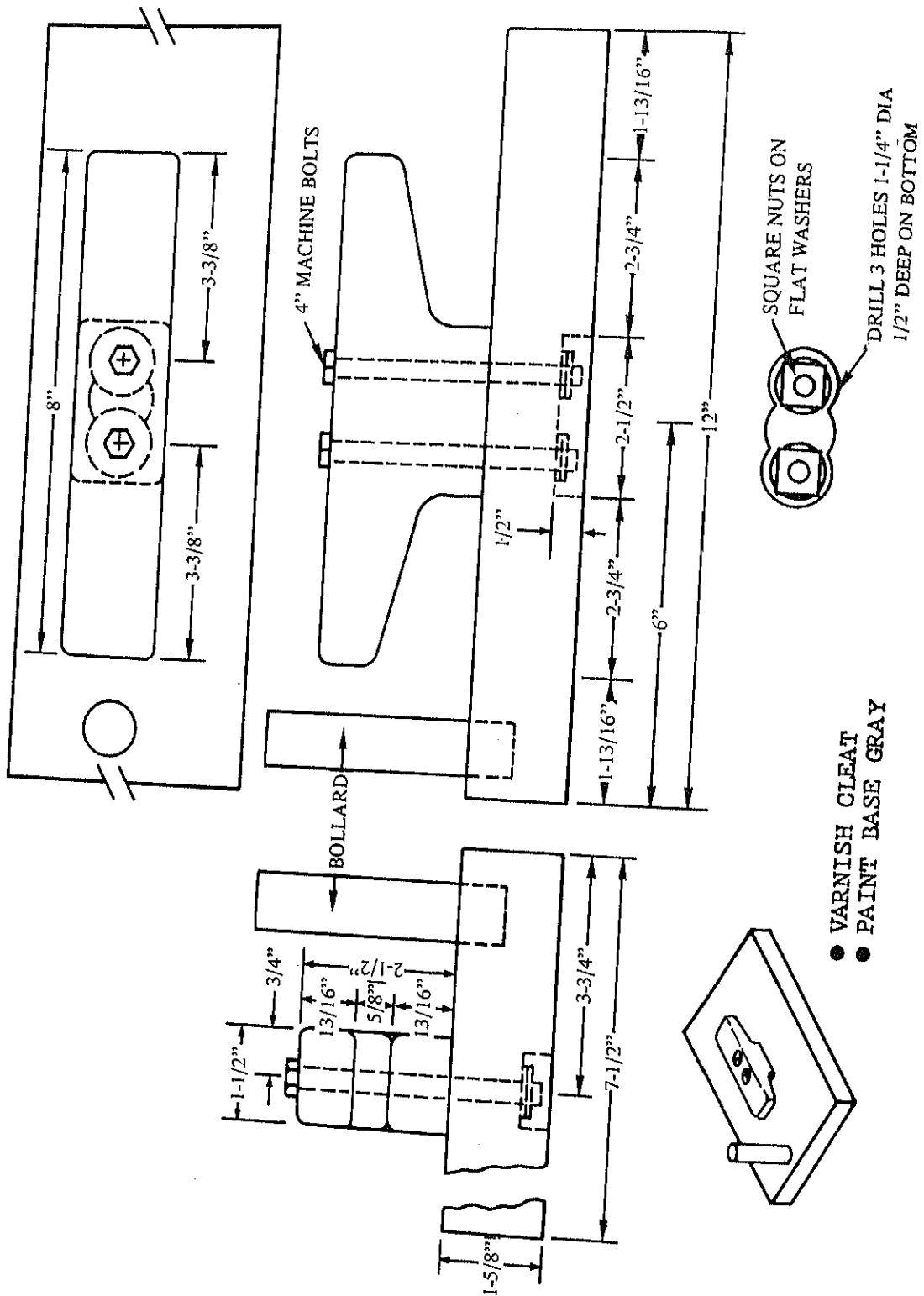
2" x 10" x 3' board.  
Cleat is made from a 2" x 4" x 10" piece of fir. Bollard is made from a 10" piece of 1 1/2" dowel.

Submitted by:

G. Beardslee  
Flotilla 94  
Oak Knoll

Cost: \$2.00

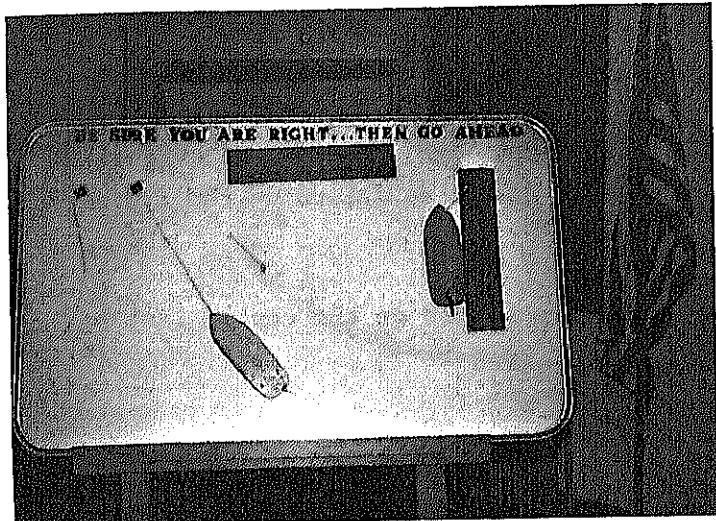
### Cleat And Bollard



## MAGNETIC BOARD

### Suggested uses:

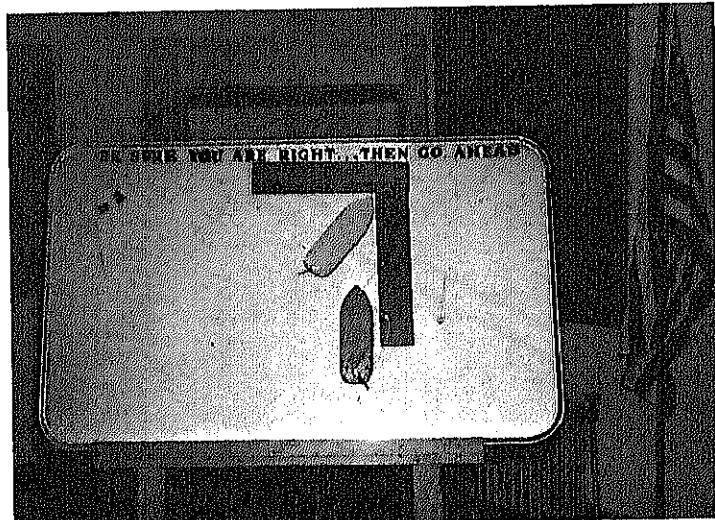
Boat Handling  
Aids to Navigation  
Rules of the Road  
Search and Rescue  
Maneuvering



The main item is a metal drip pan as used under your automobile.

Various cut out boat shapes and pier sections, mooring buoys, current and wind indicators, navigational aid and other items are prepared with flat magnets glued to the underside.

These objects may be placed in countless positions indicating any condition that might be encountered in boating.



Submitted by:

Sam Morse  
Flotilla 94  
Oak Knoll

Cost: \$5.00

## PELORUS

A simple Pelorus may be constructed from a 6" X 6" square of 3/8" plywood that is sanded and varnished. This is the base of the Pelorus.

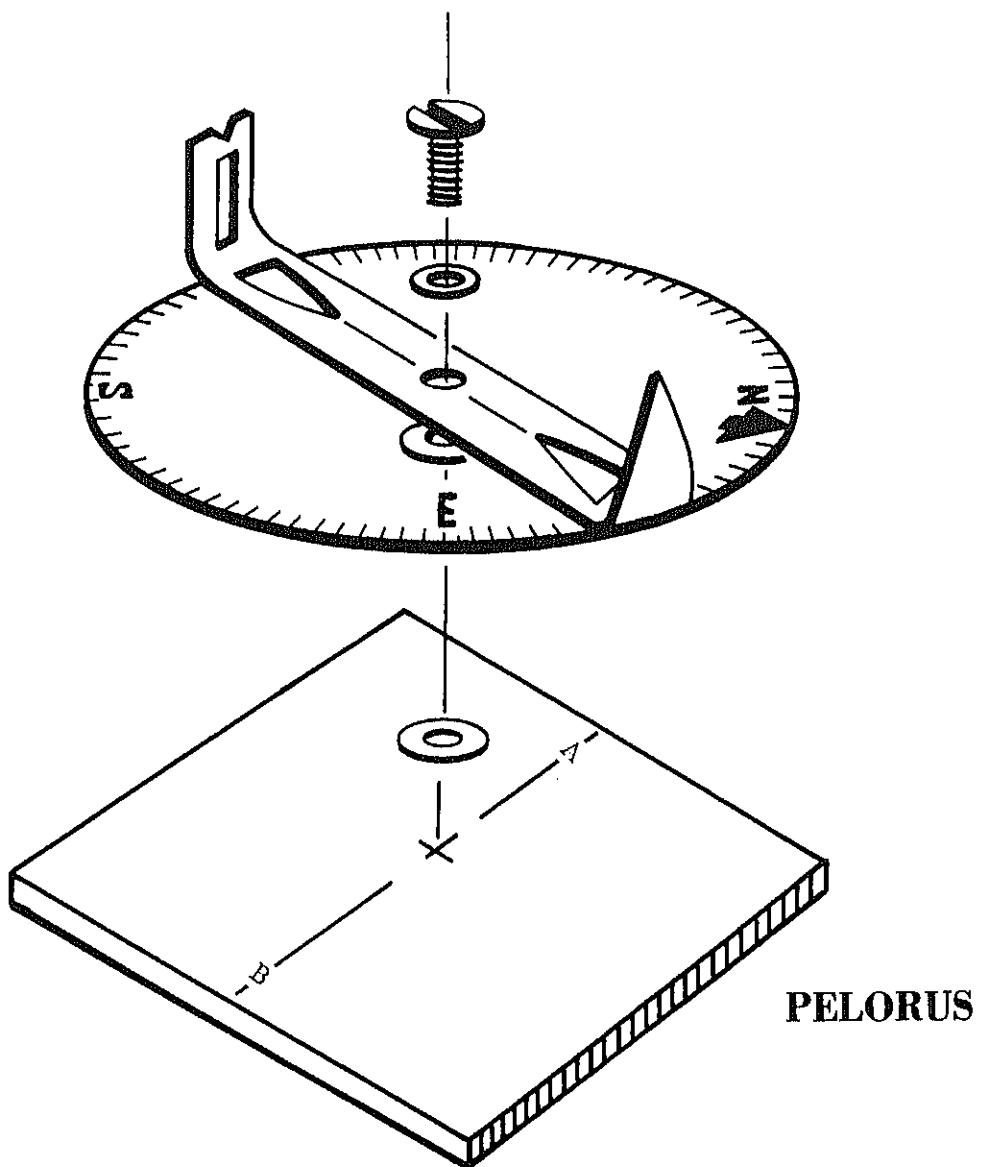
A movable compass card is made from a paper compass card copied from a Chapman's Text, and glued to heavy cardboard stock and trimmed to shape. Flat washers on either side of the card allow for smooth movement of the assembly.

Light lines drawn from opposite corners of the base determine the center of the base which is punched with an awl.

A round head wood screw of suitable size is placed on the center line to assemble all of the above components.

Submitted by:

Ralph R. Hoffman BC-TSA



## COMPASS INSTRUCTION MOCKUP

A valuable and easily made tool in teaching theory compass instruction is the Compass Instruction Mockup. The cost of assembly is minimal and the instructional value is great.

The device can be used to show simply and conclusively that the boat rotates around the compass card on various headings while the N or 0 degree marking on the compass card remains steadily pointing to magnetic north.

Later the effect of variation and deviation can be easily shown.

A simple pelorus suspended over the compass card can also be used to illustrate relative bearings.

Construction is not difficult and the entire device can be made in a single evening.

The base is a 36" x 36" piece of 1/4" hardboard reinforced in back by a 1" x 2" frame and a single 1" x 2" stringer down the center. The base is then painted a light blue to represent water and the four cardinal points of the compass N, S, E, and W marked at the middle of each edge.

A boat hull outline is then cut from the same hardboard measuring 22" in length with a beam of 8".

Following this, saw a 12" diameter compass card out of the same 1/4" hardboard.

Paint the boat black and the compass card white. A white lubber line is drawn longitudinally along the keel line of the boat.

Paint or draw the cardinal points of the compass on the card and carefully divide the card into 360 degree markings and numbering the degrees with india ink.

A 1/4" hole is then accurately drilled through the exact centers of the base, compass card and the boat hull outline.

Use a 1/4" stove bolt to pass through all three of the above with the compass card on top of the boat with both centered over the hole in the base.

Sufficient flat washers should be placed between all three of the above to allow the boat and compass card to pivot independently of the other.

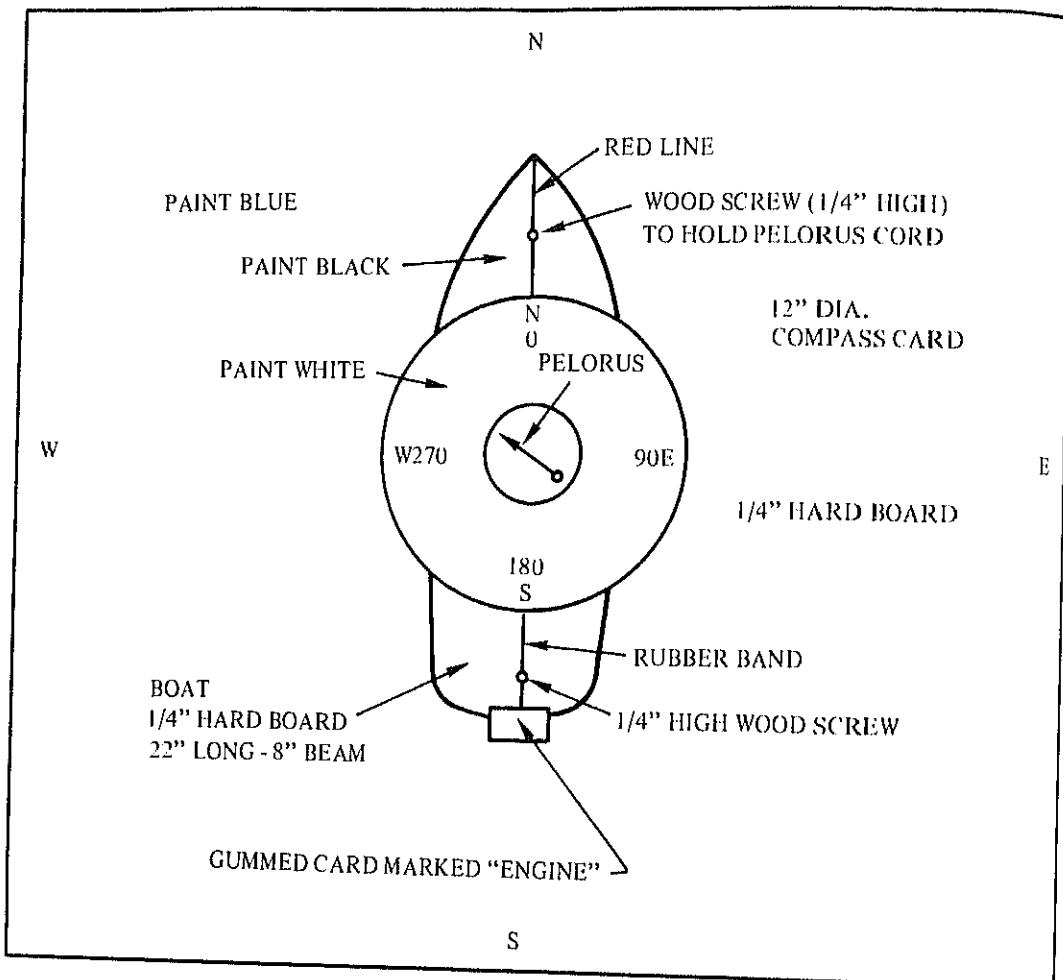
This Pelorus is made of cardboard with cardboard sighting vanes. On the bottom center of the Pelorus card is a metal ring 1/2" thick. that centers over the round head of the stove bolt that holds the card and boat to the base board. The Pelorus is held in place by a thin string with a loop on one end that slips over a round head wood screw on the keel line of the boat near the bow. A long rubber band stretches from the rear of the Pelorus to a wood screw on the keel line of the boat near the stern.

Thus, relative bearings may be explained with this addition to the mockup which may be removed at will.

Submitted by:

Norman Weil  
Flotilla 21 9ER

COMPASS INSTRUCTION MOCKUP



1/4" Hardboard 36" x 36" Baseboard  
(reinforced on back)

Submitted by:  
Norman Weil  
Flotilla 21 9ER

## VARIATION CHART

ning aid is used to demonstrate the theory of "Variation  
ent geographical locations in the United States. It is  
: to measure actual degrees of variation.

struction consists of an outline of the boarders of the  
ates, in dimensions useful for classroom instruction  
ch two offset arbitrary points are selected approximating  
ion of the "magnetic" and "geographic" North Poles. At  
it, a nail or heavy pin is inserted. An elastic thread of  
it length is tied at each end to the two points.

ointed object, such as a pencil or nail for example. the  
: stretched "south" to any point in the United States. The  
the two limbs of the stretched thread from the simulated  
: "Variation".

ing various locations, one can demonstrate why the degree  
:ion changes with the geographical location.

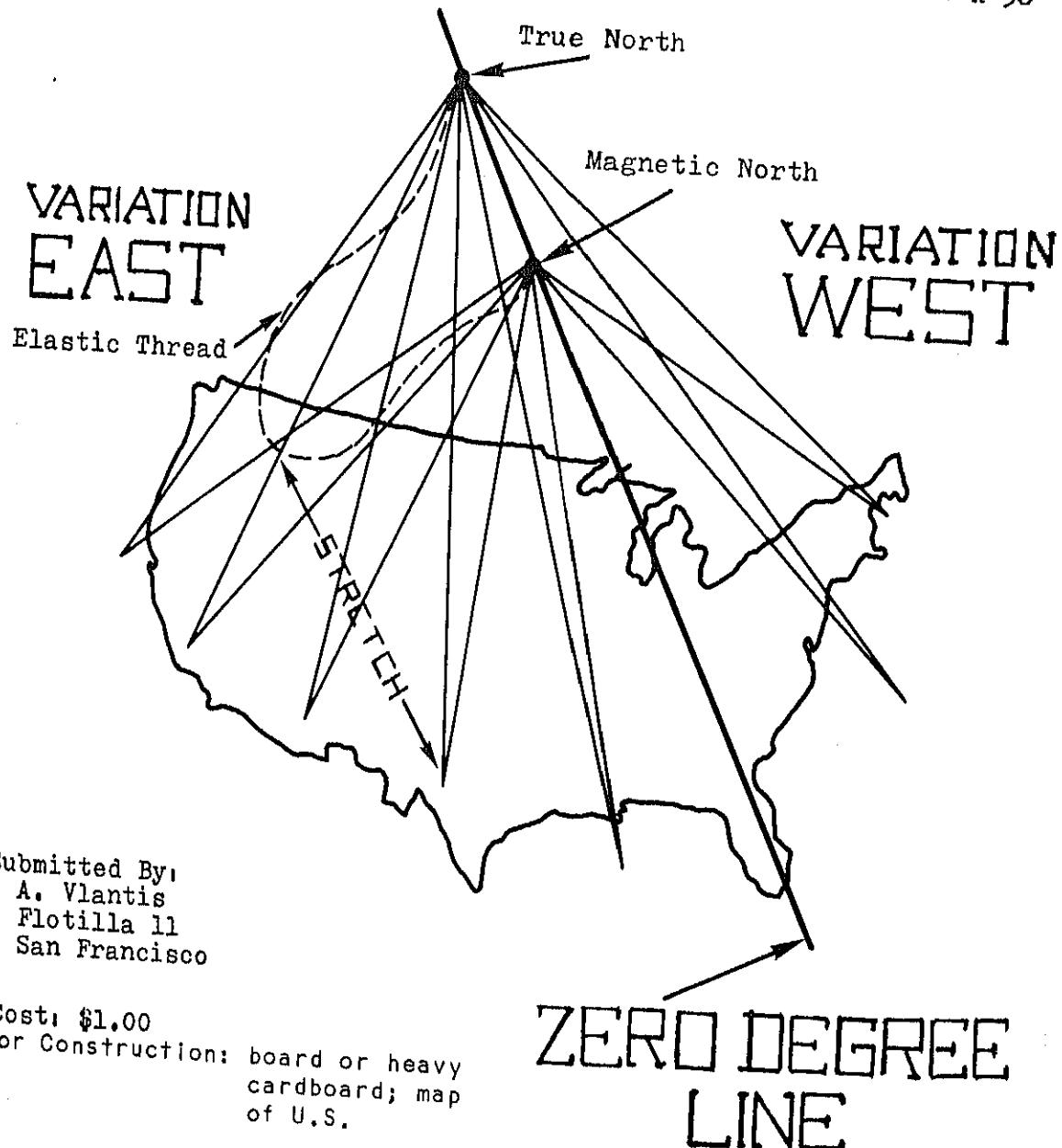
Submitted By:  
A. Vlantis  
Flotilla 11  
San Francisco

## VARIATION CHART

The changes in variation in the United States.

Elastic thread stretched to any point in the United States will demonstrate the degrees of variation.

Classroom chart should measure about 24"x 36"



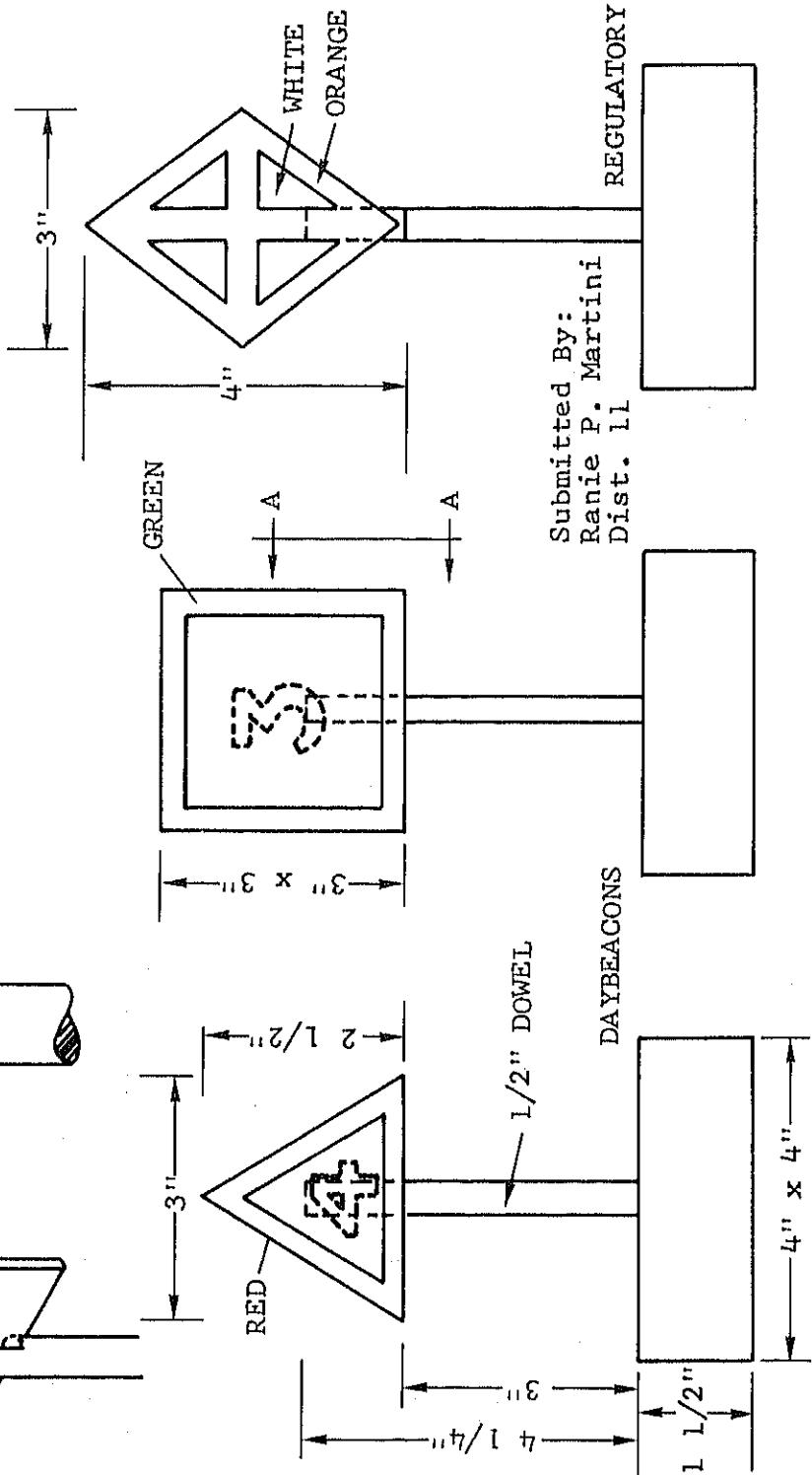
Aids To Navigation Mockups

NOTE : 1/2" REFLECTIVE COLOR  
BAND OF APPROPRIATE  
COLOR ON  $\Delta$  &  $\square$

DAY BEACON

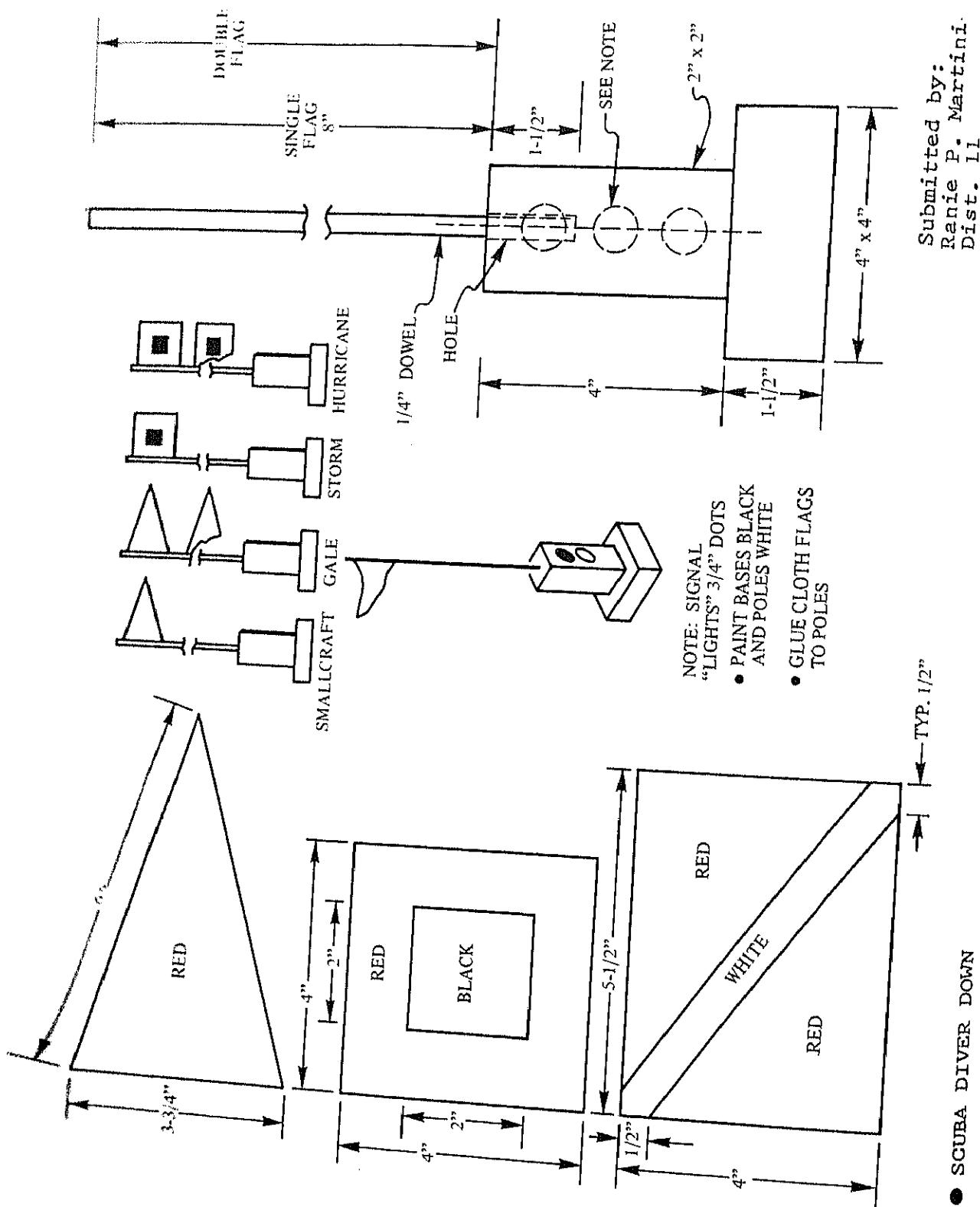
1 1/4"

DOWEL



Submitted By:  
Ranie P. Martini  
Dist. 11  
REGULATORY

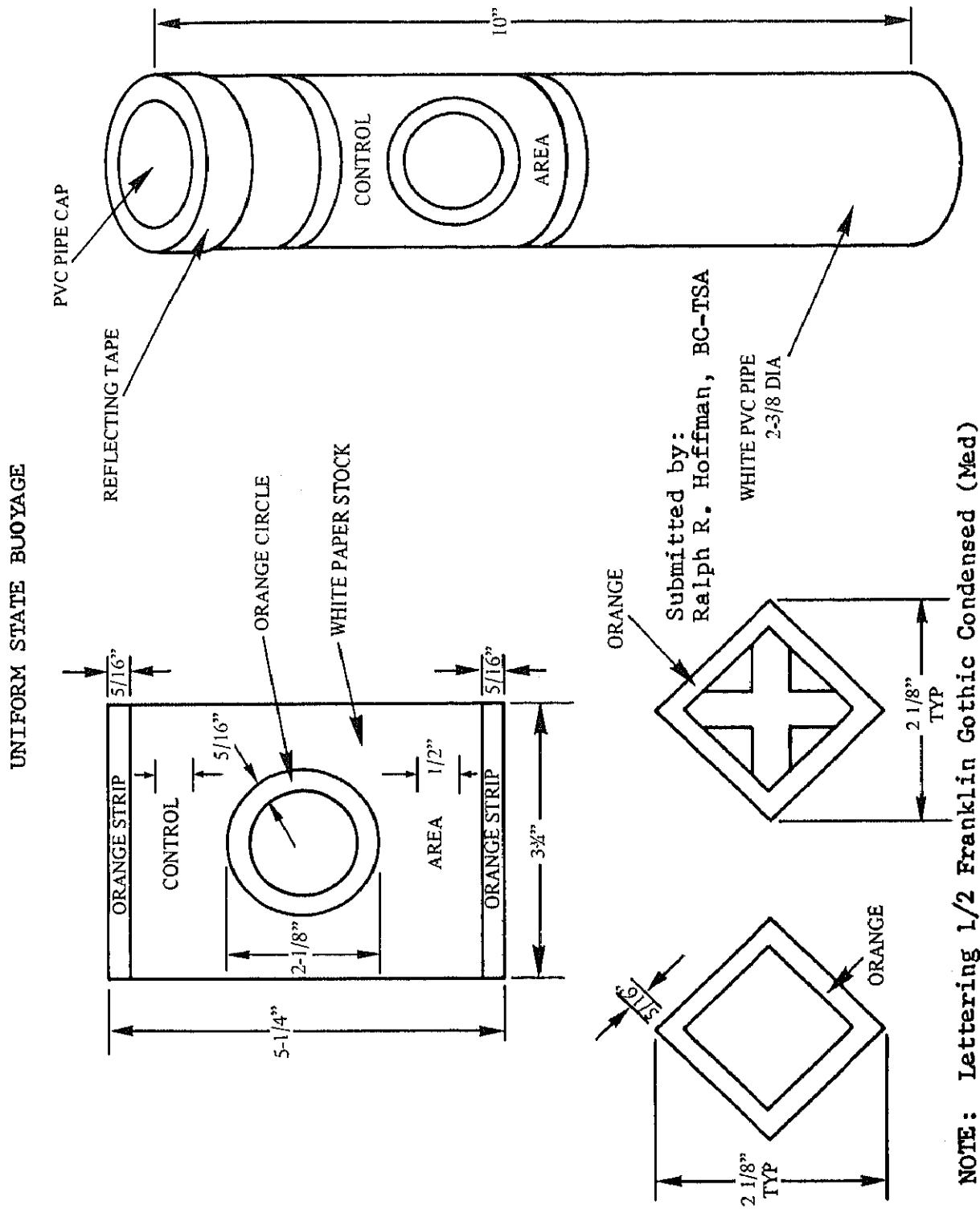
Aids to Navigation Mockups



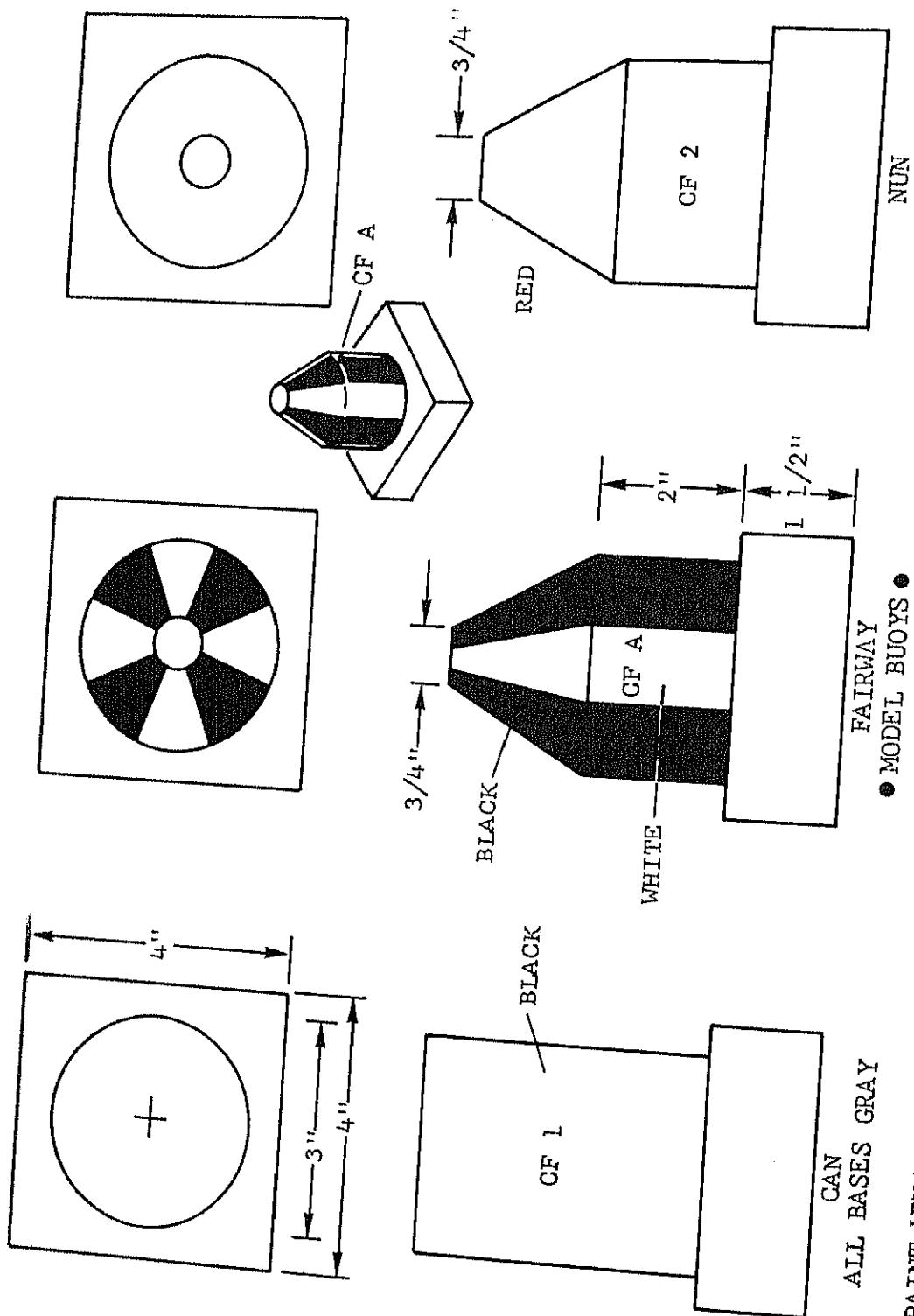
● SCUBA DIVER DOWN

Submitted by:  
Rannie P. Martini.  
Dist. II

Aids to Navigation Mockups



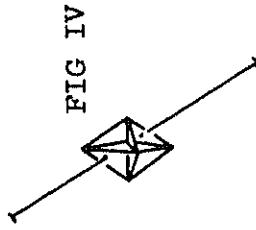
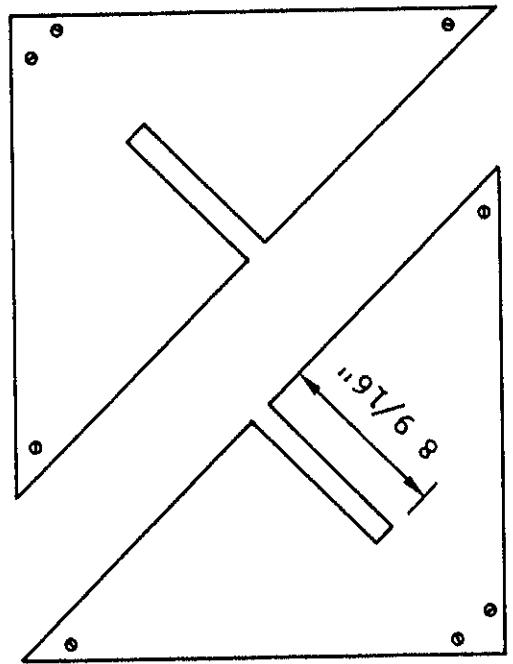
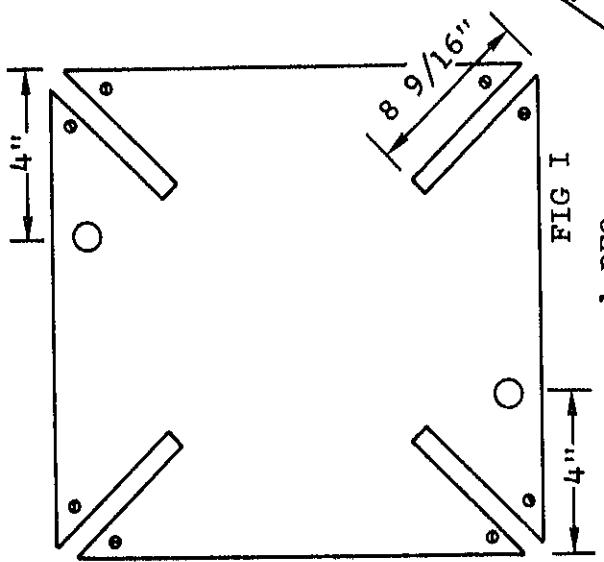
Aids to Navigation Mockups



- PAINT WHITE NUMBERS AND LETTERS ON CAN & NUN BUOYS - BLACK ON FAIRWAY.
- FAIRWAY & MODEL BUOYS •
- Submitted by:  
Ranie P. Martini  
Dist. 11

Aids To Navigation Mockups

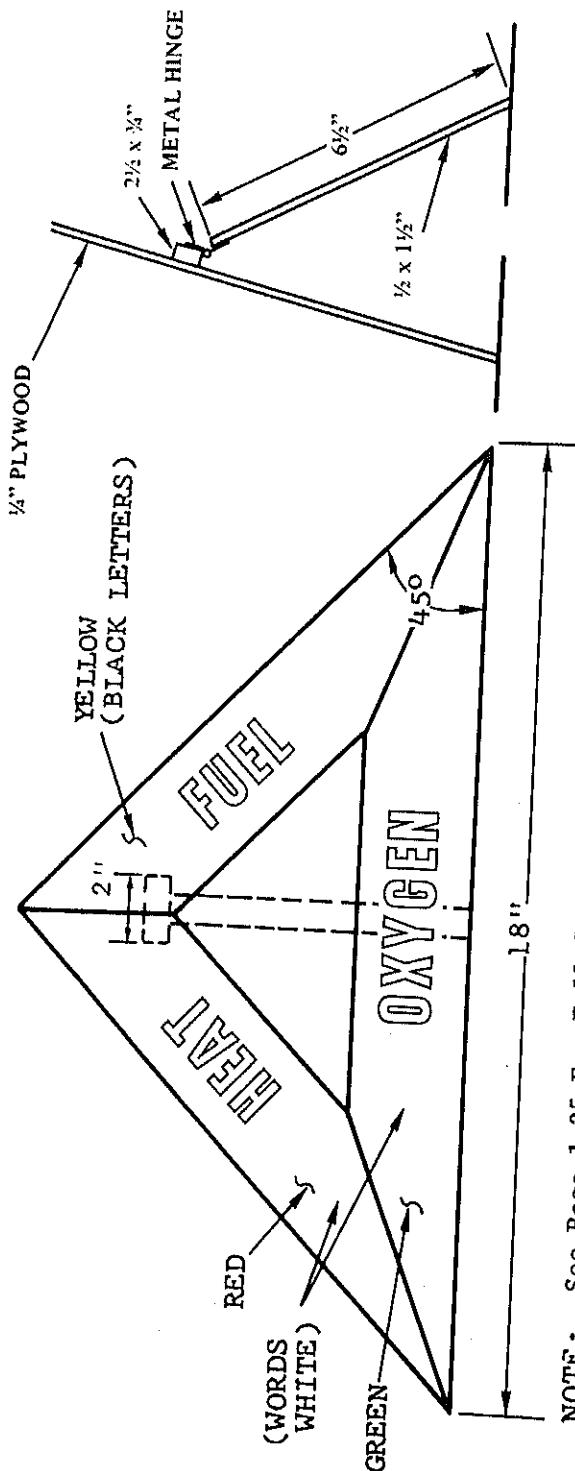
RADAR REFLECTOR



NOTES:  
 CUT 3 PANELS 12" x 12"  
 MATERIAL: 040 ALUMINUM  
 OR 1/2" PLYWOOD  
 IF PLYWOOD IS USED GLUE  
 ALUM. FOIL TO ALL SIDES  
 1. CUT 2 PANELS DIAGONALLY TO MAKE  
 4 TRIANGLES - FIG. II  
 2. DRILL 1/4" HOLES IN ALL CORNERS FIG. I & II  
 3. DRILL 2 3/8" HOLES 3/8" FROM EDGE FIG. I  
 4. CUT DIAGONAL SLOTS HALF WAY TO CENTER  
 FIG. I & II.  
 5. SLOT WITH SLIGHTLY WIDER THAN  
 MATERIAL THICKNESS  
 6. SLIP PIECES TOGETHER AND WIRE SECURELY  
 IN PLACE FIG. III  
 7. RIG WITH HALYARD - BOTH UP & DOWN HAUL - FIG. IV  
 8. BE CAREFUL TO AVOID CHAFING.

Submitted by:  
 Milton Entwistle, DVC-EG

## Fire Triangle

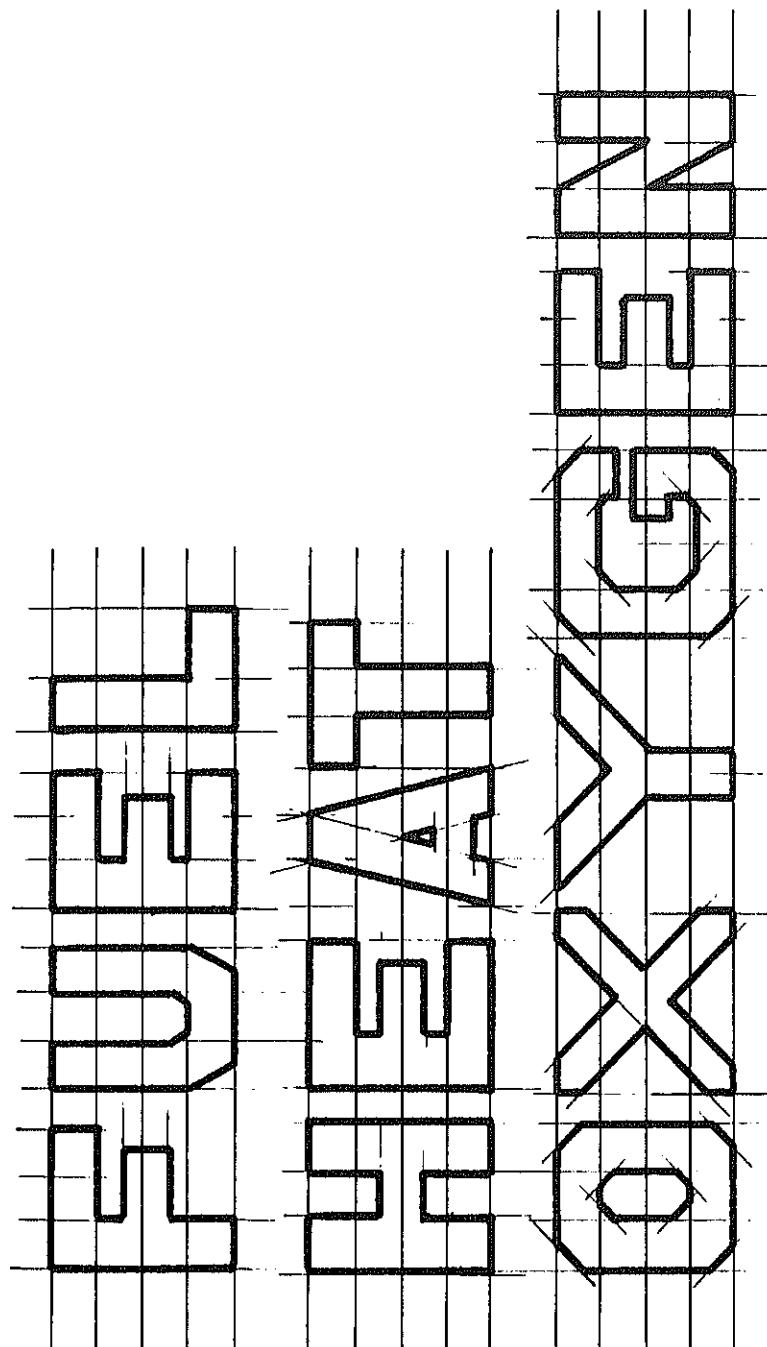


**NOTE:** See Page 1-25 For Full Scale Letter Patterns.

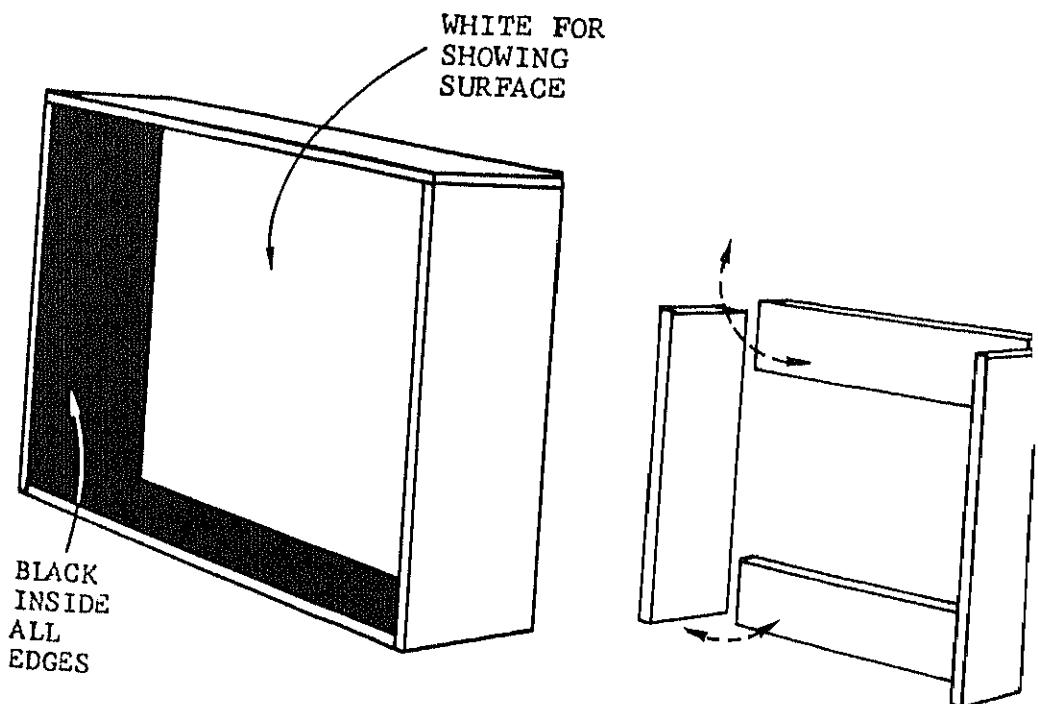
FIRE TRIANGLE

Submitted by:  
Milton Entwistle, DVC-EG

Fire Triangle

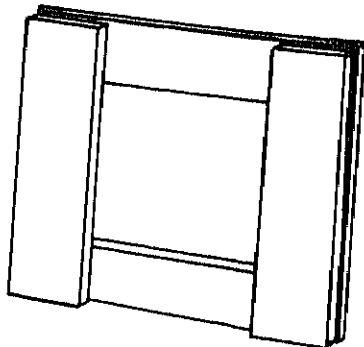


Submitted By: Milton Entwistle DVC-EG



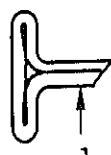
\*SHADOW BOX  
Flush wing sides on film  
in lighted rooms

Submitted by:  
COAST GUARD AUX.  
FLOTILLA 14  
DIG. II

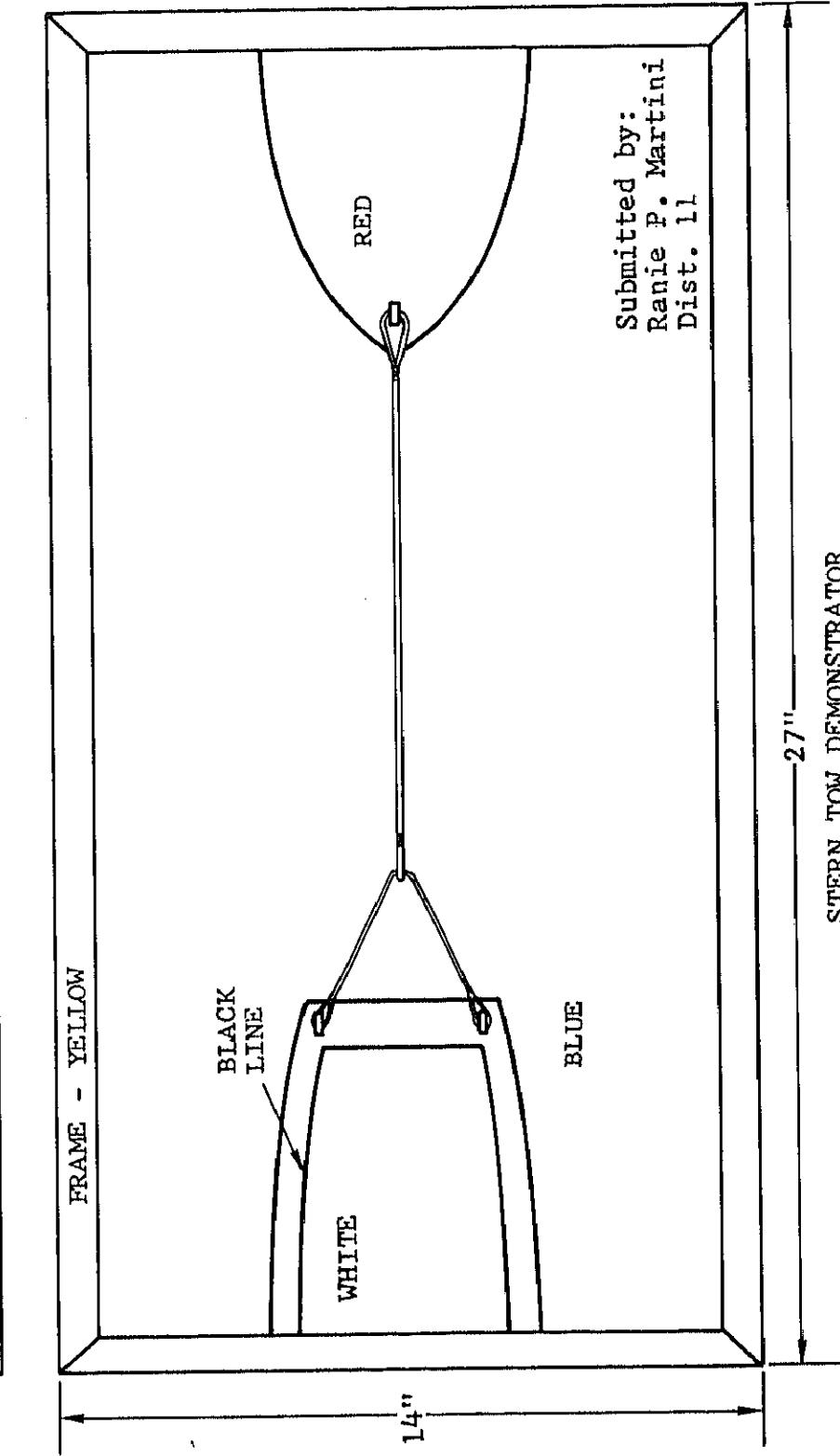


NOTE: Reverse folding  
from narrow top to sides

13 NOTES: BACKBOARD & "BOATS 1/4" PLYWOOD  
FRAME 1" x 1/2"  
RIG WITH HEAVY TWINE  
CLEATS - STIFF WIRE

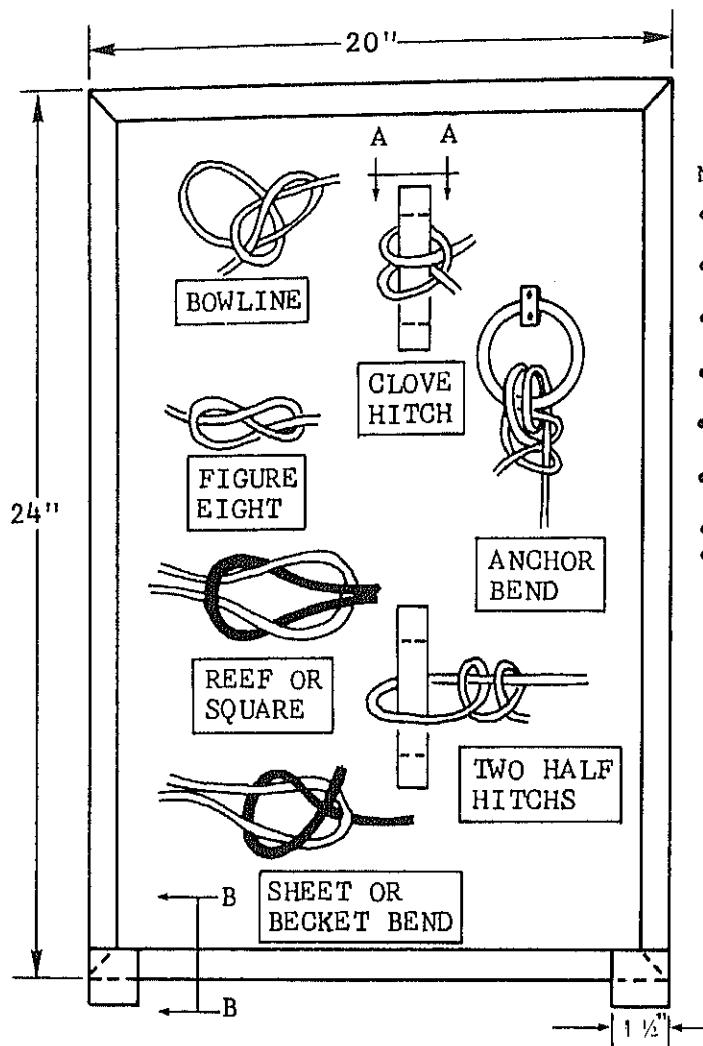


CHEAT DETAIL



Submitted by:  
Ranie P. Martini  
Dist. 11

STERN TOW DEMONSTRATOR



7 BASIC KNOT DISPLAY BOARD

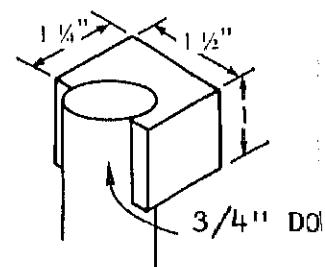
Submitted by:  
Ranie P. Martini  
Dist. 11

NOTES :

- BACKGROUND - BLUE
- BASE & FRAME - LT GREEN
- ATTACH KNOTS BY DRILLING SMALL HOLES
- TIE WITH SMALL GAUGE WIRE
- POLES ATTACHED WITH SCREW FROM BACK
- ATTACH RING WITH A STAPLE OR TIN STRIP
- GLUE OR STAPLE KNOT DESCRIPTIONS TO BOARD
- USE 1/2" LINE FOR KNOTS
- USE 1/4" & 1/2" LINE FOR SHEET BEND

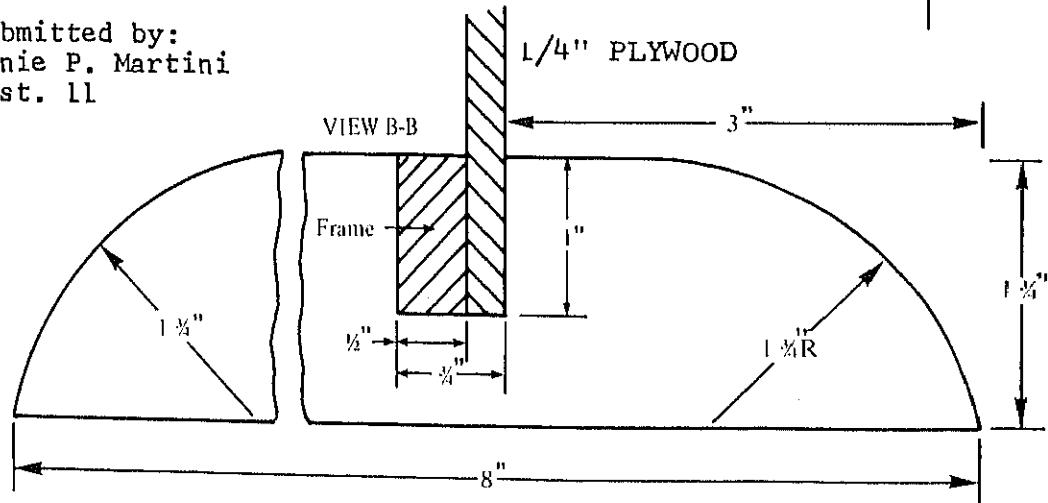
VIEW A-A

Typical Pole End  
Assembly  $\frac{1}{4}$ " Plywood



$\frac{1}{4}$ " PLYWOOD

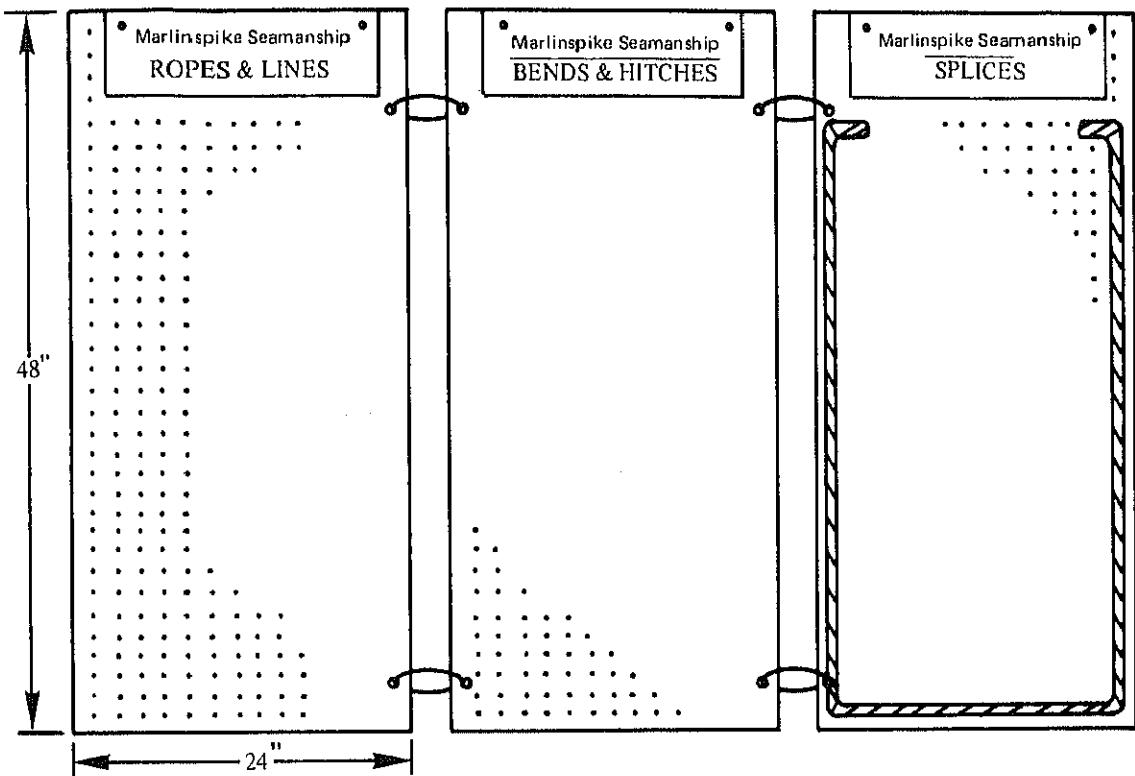
VIEW B-B



## MARLINSPIKE BOARD

Suggested uses:

Marlinspike  
Seamanship



Panels of pegboard with holes 1" x 1" spacing which are used to display the knots and hitches of marlinspike seamanship.

Sections can be hinged together for a self-standing display with 50 lb. monofilament fishline. Fishline is also used to attach knots made from  $\frac{1}{2}$ " hemp.

Headings are 6" x 8" white posterboard with black lettering, bolted to the top of each panel. Panels are trimmed with long splices.

Submitted by:

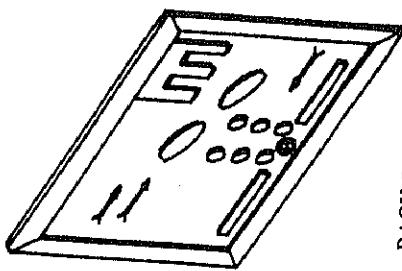
Cost: \$15.00

W. W. Kecker  
Flotilla 63  
Port San Luis

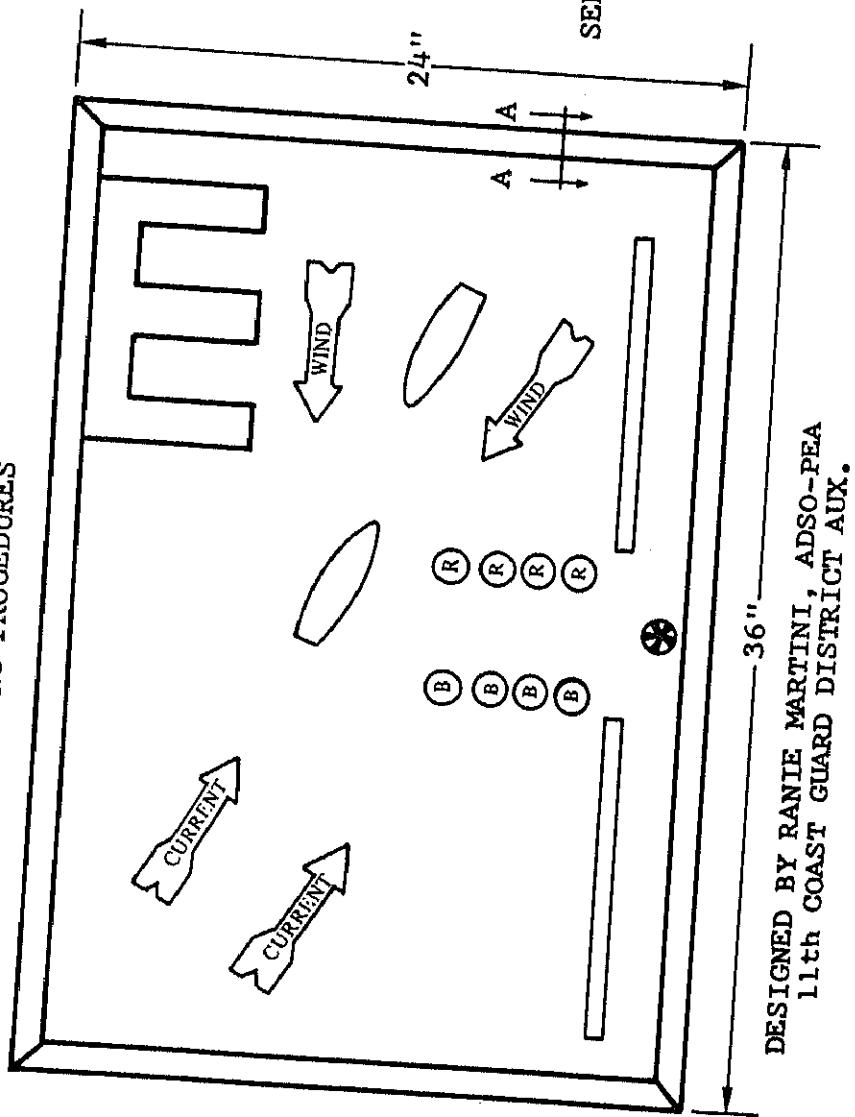
A SIMPLE MAGNETIC BOARD

MAY BE USED TO DEMONSTRATE:

AIDS TO NAVIGATION  
RULES OF THE ROAD  
DOCKING PROCEDURES



Magnetic Board



DESIGNED BY RANCIE MARTINI, ADSO-PEA  
11th COAST GUARD DISTRICT AUX.

## Magnetic Board

ALL MATERIALS ARE  
1/8" PLY PLYWOOD OR  
HEAVY CARDBOARD  
ALL FULL SCALE PAT-  
TERNS EXCEPT DOCK  
L = 1/2" MAGNETIC  
TAPE GLUED TO BACK OF  
TEMPLATES. APPROX. 1  
TOTAL REQ.

**NOTES:**

## CONSTRUCTION DETAILS

144

3 / 4 17

3 REQ.

1

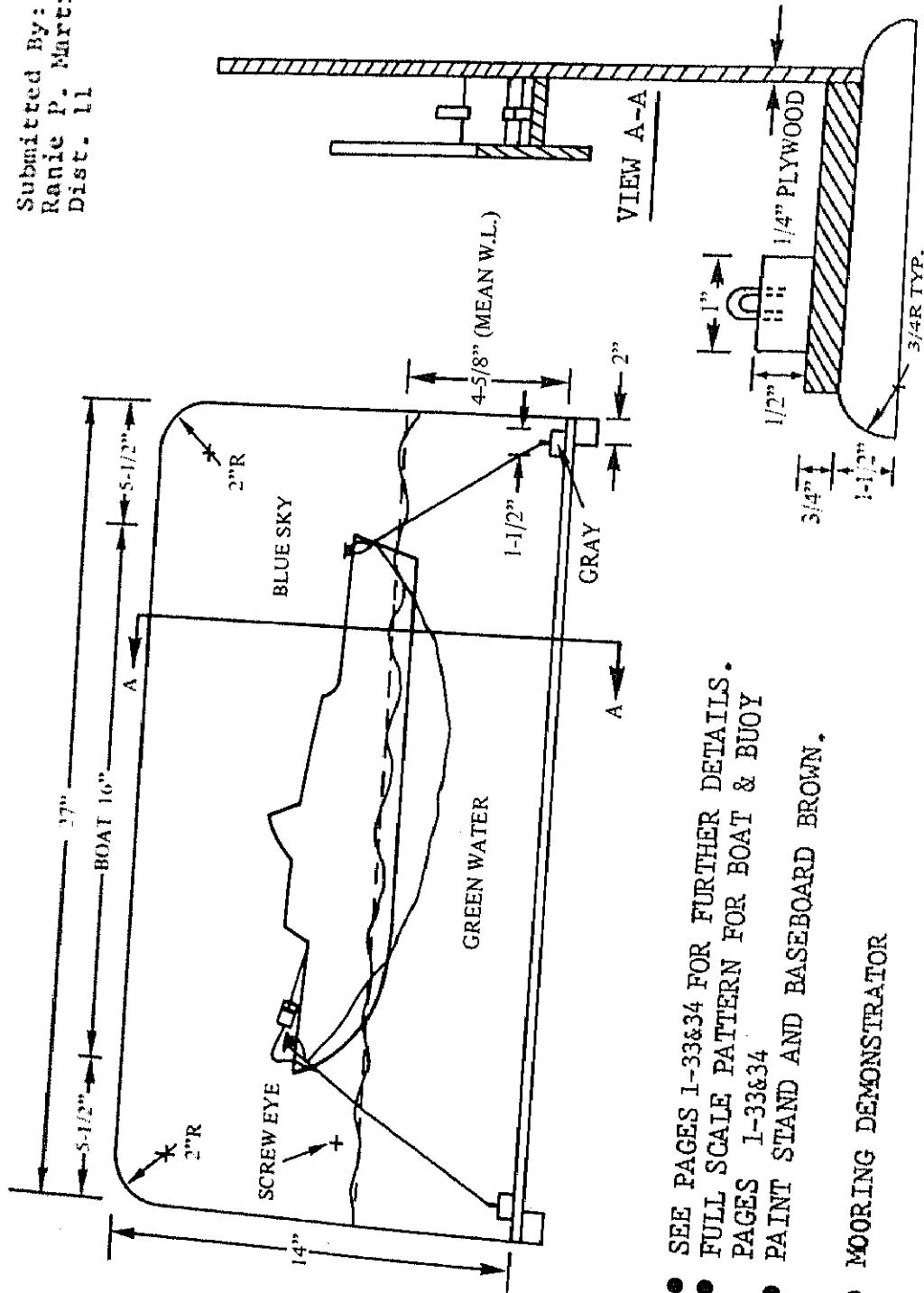
3 REQ.

BLACK & WHITE  
STRIPES  
(1 BUOY REO)

A diagram showing a vertical line labeled 'DOCK' at the top. Below it, a horizontal line is marked with arrows at both ends. The distance between these arrows is labeled '4"'. To the left of the vertical line, another horizontal line is marked with arrows at both ends. The distance between these arrows is labeled '1 1/2"'. An arrow points to the right from the '1 1/2"' label.

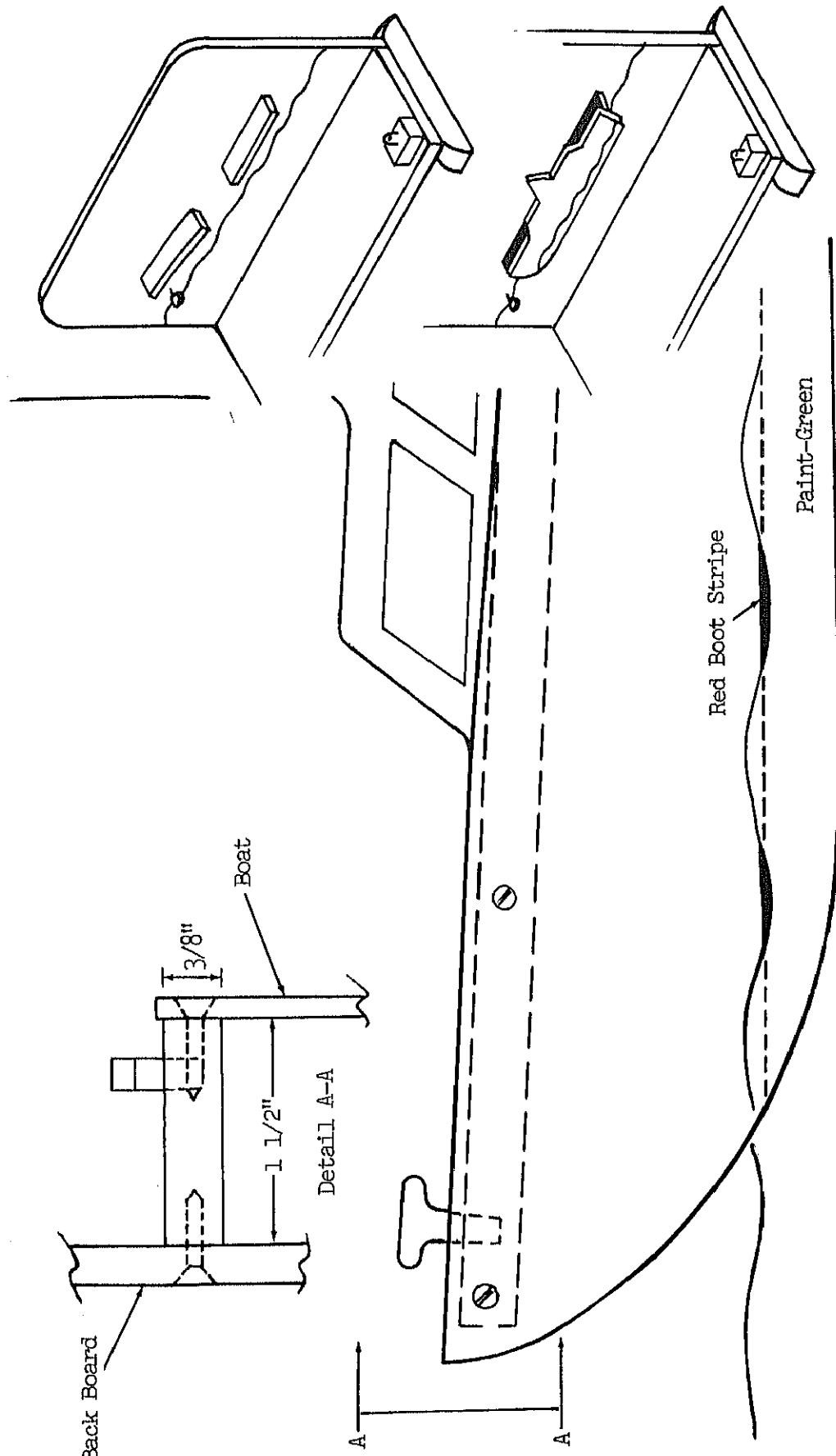
Mooring Demonstrator

Submitted By:  
Ranier P. Martini  
Dist. 11



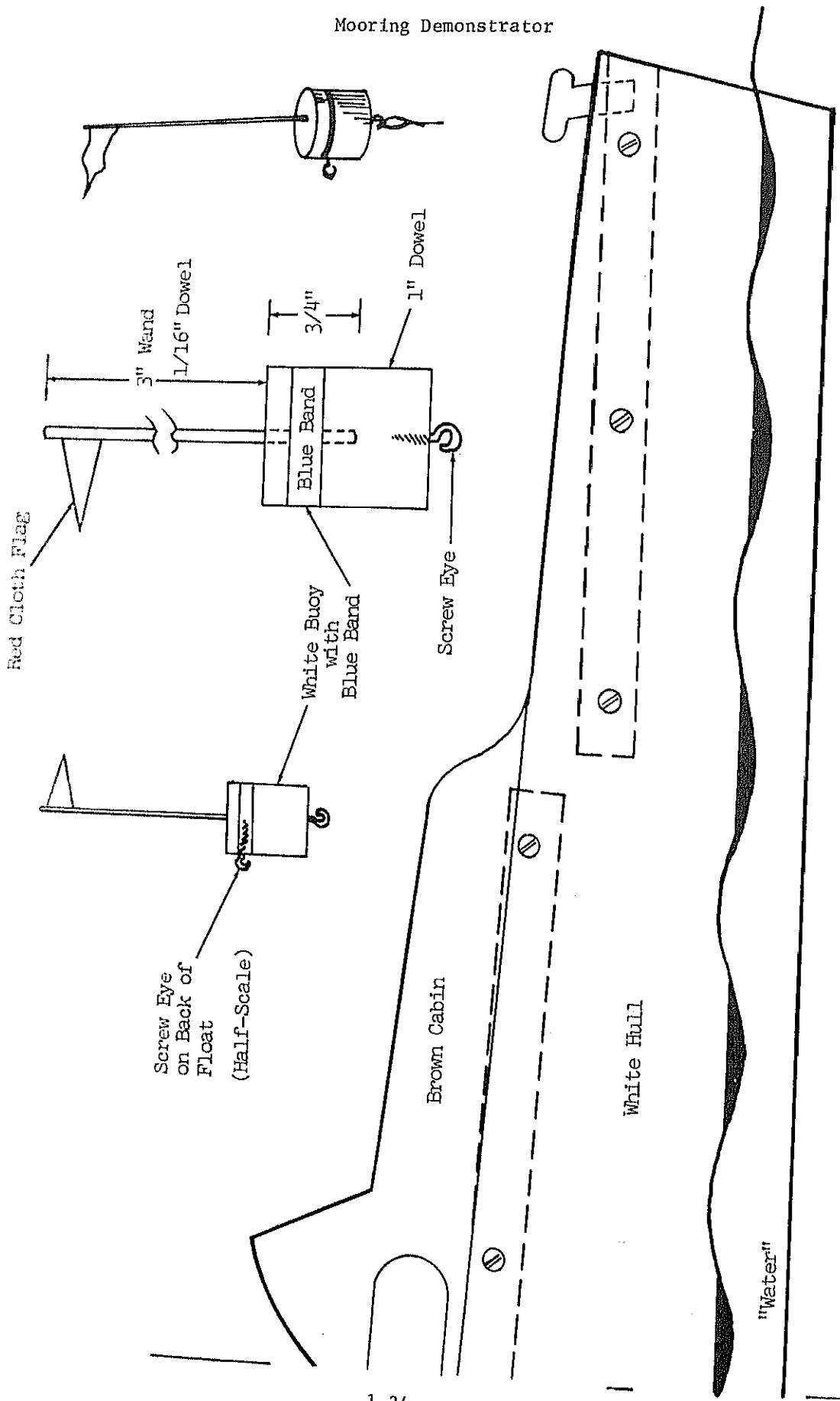
- SEE PAGES 1-33&34 FOR FURTHER DETAILS.
- FULL SCALE PATTERN FOR BOAT & BUOY
- PAGES 1-33&34
- PAINT STAND AND BASEBOARD BROWN.
- MOORING DEMONSTRATOR

Mooring Demonstrator

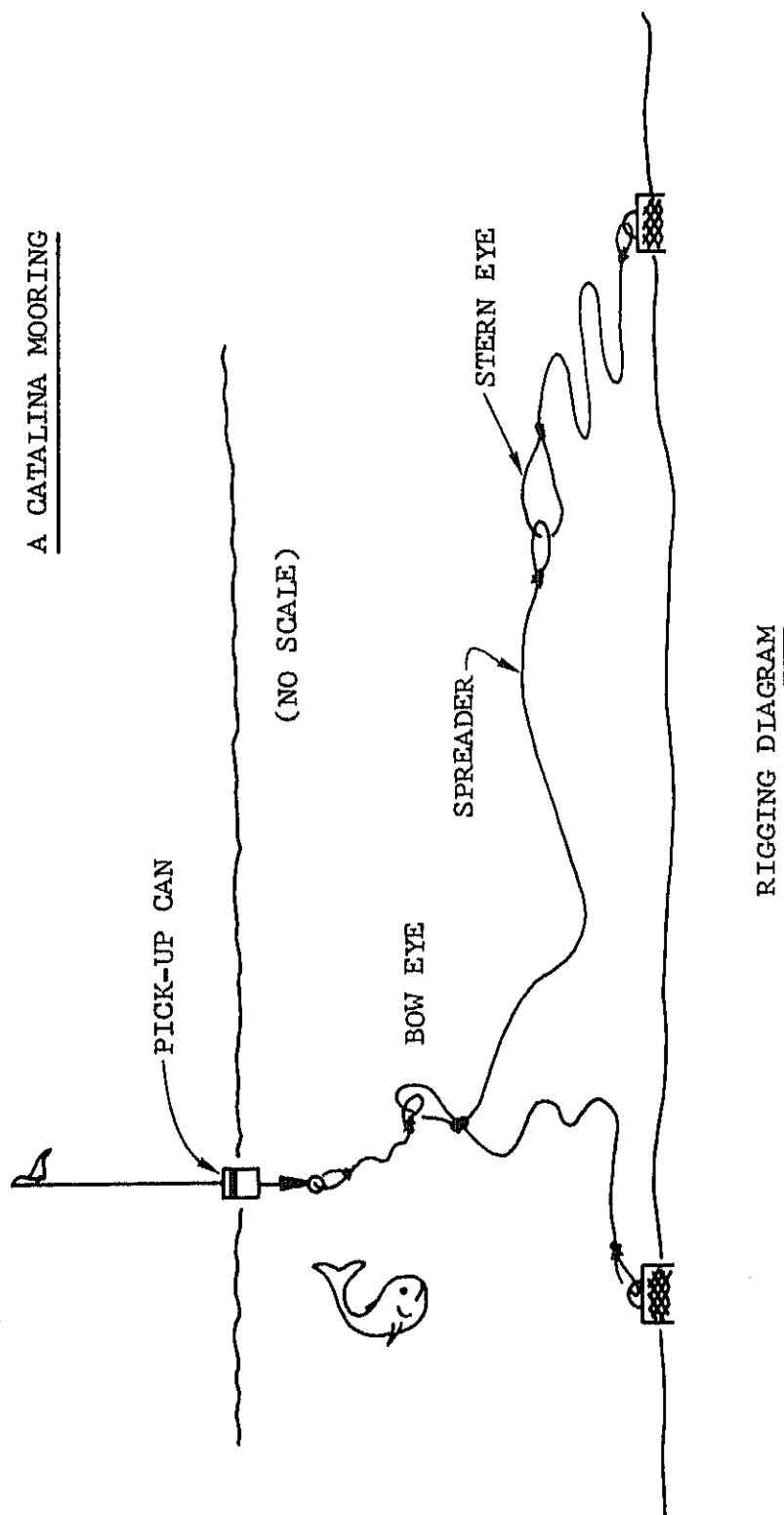


Full Scale

Mooring Demonstrator



Mooring Demonstrator



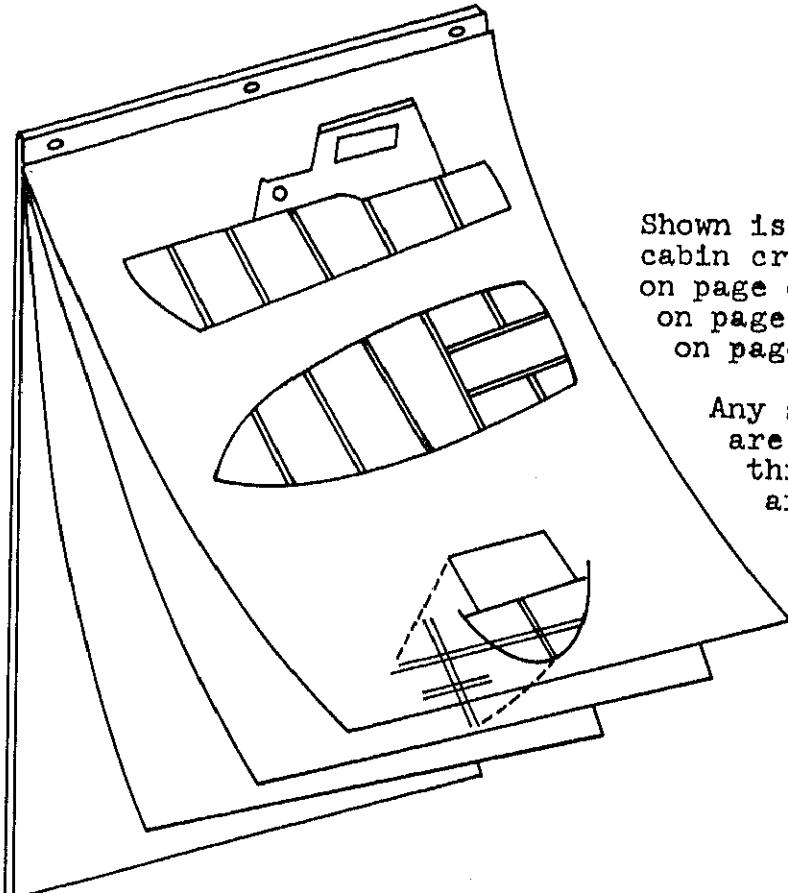
## OVERLAYS

Suggested uses:

Sailors' Language

Example shows three sketches drawn on separate MYLAR or ACETATE overlays, multicolored, one color per sheet, per phase of construction.

Display starts with first MYLAR sheet showing framing, keel members and progresses to a finished vessel "built before your eyes", as MYLAR sheets are brought over singularly to show next stage of construction.



Shown is a typical cabin cruiser, framing on page one, superstructure on page two and propulsion on page three.

Any subject where parts are added could utilize this type of training aid.

With white poster board backing it can stand or be hung.

Submitted by:

W. W. Kecker  
Flotilla 63  
Port San Luis

Cost: \$18.00

## BOAT TIE UP DEVICE

One need only walk down a pier where cruisers and smaller boats are moored to realize the great need for instruction on the proper method of tying up a vessel, be it large or small. Aside from the many ratty ties to cleats and bollards, the almost complete lack of appropriate spring lines is immediately.

Let's examine some thoroughly tested mooring techniques. Always tie the stern with a relatively tight outboard stern line running from the outboard stern cleat diagonally to the pier fittings. This will hold the boat hull parallel to the pier. Furthermore, the stern will rise and fall easily as a wave passes under with no pinching against the pier and no upward pull on the pier. The long stern line permits the boat to rise and fall through a greater are from the pier fitting.

Spring lines are the most important and most neglected lines used in tying up a boat. Always use two long crossed spring lines. The length of each of these should be at least 3/4 the length of your boat. These spring lines should be tied tight. The use of long, tight spring lines will arrest all fore and aft movement of the boat along the pier and will allow the boat to ride freely with changing water levels.

To check whether the lines are tied properly, push the boat away perpendicular from the pier. If all lines tighten uniformly, the lines are tied properly. Now try and move the boat fore and aft parallel to the dock. There should be no appreciable movement. If the bow line or the stern line tightens with fore and aft movement, then the spring lines are too loose.

Always be certain the side of the hull is well fendered with large fenders correctly positioned.

In order to demonstrate the above technique a very simple but functional boat tie up device can be quickly and inexpensively made. The device may be sawed from 1" thick wood shelving stock. A boat 20" long with a beam of 7" makes a good demonstration hull.

Screw a small bitt or cleat near the bow and four additional small (2 1/4" long between horn tips) cleats as follows. One on the starboard near the stern and a forward cleat just aft of the bow curvature. Place the other two small cleats in similar position on the port side.

Simulated fenders may be cut from 3/4" clear plastic polyflow tubing. Cut each fender 1" long and pass a nail through the inner wall of each of the simulated fenders to the boat side.

A pier may be easily made from 1" x 3" wood stock about 30" long. Bore five equidistant 1" holes through the board.

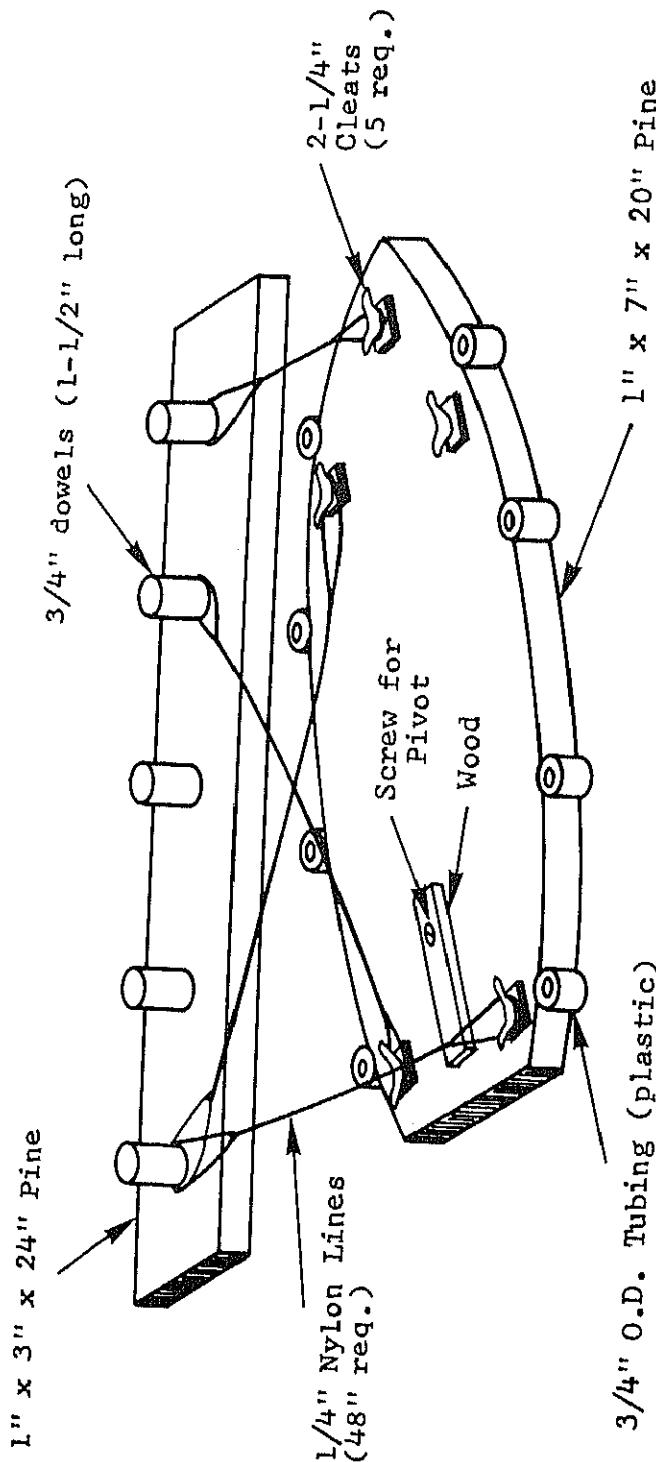
Use 5 - 1" dowels cut to 5" lengths to represent the pier bollards. Spread glue on surfaces of both holes and dowels and tap into pier board flush with the base.

Four mooring lines are made up of 1/4" nylon lines wound or whipped correctly. Four lines are required. The spring lines should be 24" long. The bow and stern mooring lines are 15" long. Tie a 2" diameter bowline on the end of each of each docking line. They may be color coded if desired.

You may easily attach the pier device to the table top using 2" wide plastic heating duct tape or with two medium size "C" clamps.

Here is an excellent opportunity to use the effective one to one teacher-student teaching technique. First, have the senior instructor present docking, mooring and casting off techniques to the entire class. Then have the assistant instructor check out each student individually with the device on a table in the hallway outside the classroom to insure his complete understanding of these mooring techniques.

## Boat Tie Up Device



### BOAT TIE UP DEVICE

A simple visual aid that gives the instructor an opportunity to demonstrate to students various techniques of docking a single or twin screw vessel.

Use it to demonstrate approaching a pier, maneuvering with a single spring line, correct tie up technique and how to leave the pier correctly. Wind and/or current direction may be indicated by the instructor.

Ralph R. Hoffman, BC-TSA

## Aids To Navigation Multiple Light Mockup

Suggested Uses:  
Aids to Navigation  
Piloting  
Seamanship

An inexpensive device (total cost about \$10.00) employing light phase characteristics and colors of lighted buoys can be made in about two hours time once the materials are assembled.

A piece of shelving board approximately 10" wide by 48" long is sanded and painted blue and three 1/2" holes drilled through the board in the following manner.

Draw a pencil line down the center line the length of the board. Drill the second hole 24" in from one end. Cut a 1/2" diameter wood dowel into three pieces each 2" long. Spread glue on dowels and holes and tap into board flush with the base. When dry, drill a 1/8" diameter hole the length of each dowel to accept 2 small insulated wires.

Three brackets for four 14" wood (removable legs) are then screwed into place equi-distant from the four corners of the underside of the board. The legs allow the mockup to be 14" above a table or desk top for better visibility by the students. Be sure to use removable legs for ease of transporting.

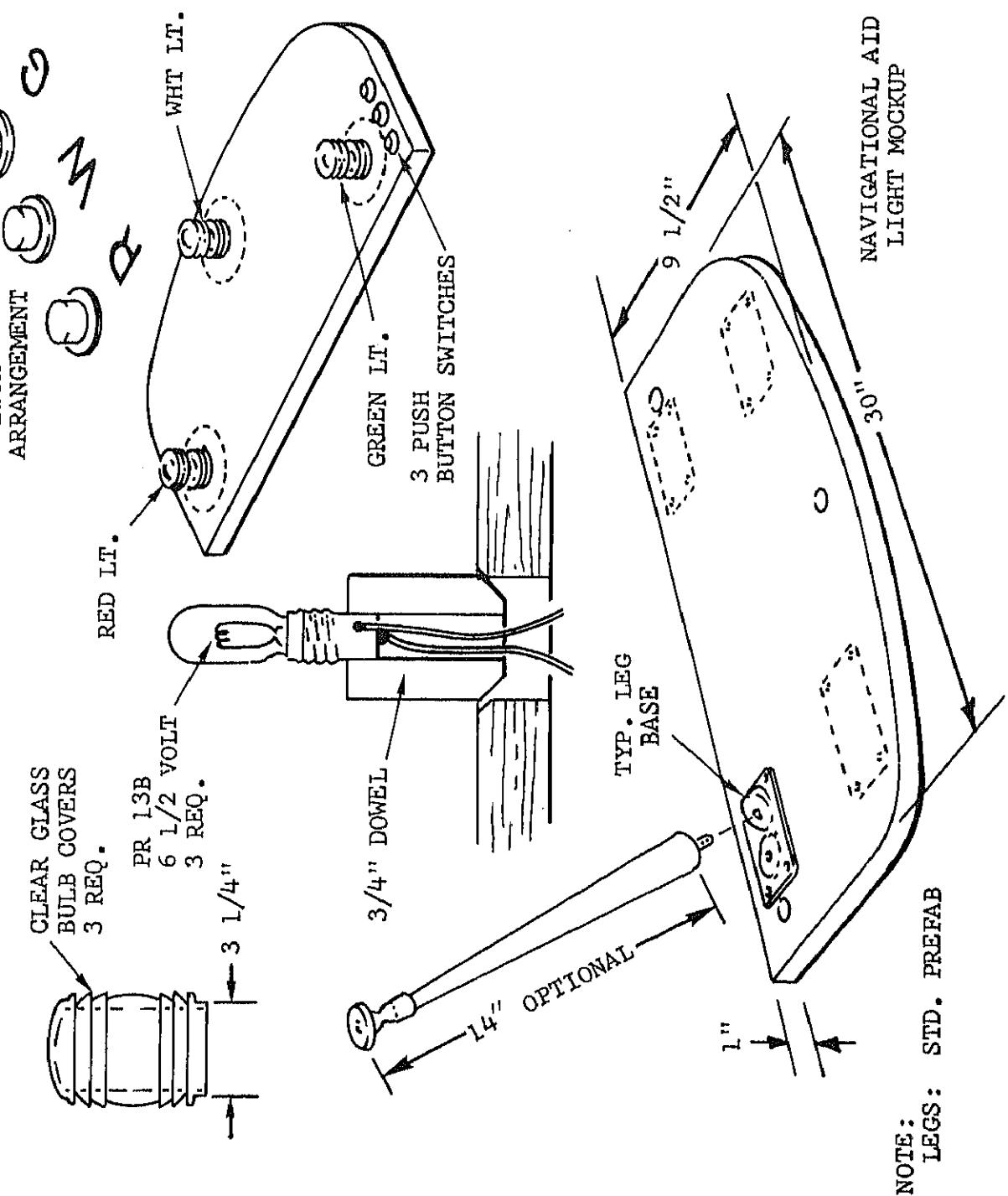
Mount three door bell push buttons through holes drilled next to one another on one end of the board top.

Tape or otherwise affix a 6 volt lantern battery (ex. Eveready #509) lantern battery) to bottom of board.

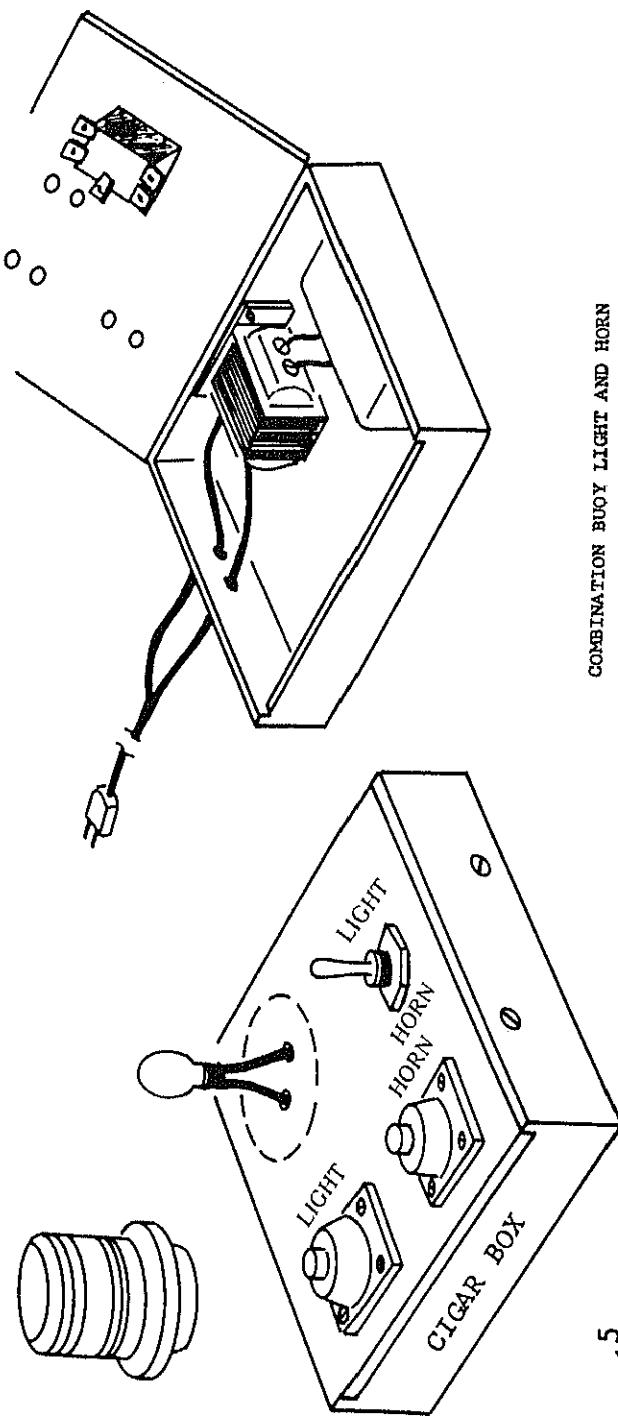
Use GE PR 13 (or other small volt bulbs) for the lights. Paint one bulb red and the other green, using model airplane enamel. The third bulb is left clear.

Submitted by:  
Ralph R. Hoffman BC-TSA

Navigational Aid Light Mockup



## Combination Buoy Light And Horn



### COMBINATION BUOY LIGHT AND HORN

Use in both the Aids to Navigation and Rules of the Road Classes.

This simulated lighted buoy utilizes a manual push button that lights the 10V bulb to give various light characteristics. The second push button energizes a 10V buzzer to simulate a vessel's horn. A double pole, single throw switch enables switching to light or horn.

Cycle the light or horn by counting: one thousand and one, one thousand and two, etc.

This aid operates on 110 volts, AC, which is reduced in a bell transformer to 10V output. Battery operation is optional to make the aid completely self-contained.

A small clear plastic anchor light lens simulates the frenzel lens of a buoy light.

TO 110V  
SOURCE

## RANGE LIGHTS

Suggested Use:

Aids to Navigation  
Piloting  
Seamanship

A simple and inexpensive demonstration of Range Lights can be made by purchasing two electrical plastic candle sticks with flasher type bulbs. These can easily be obtained during the Christmas season.

A 30" length of 2 x 4 stock forms the base with a 5" block of 2 x 4 nailed on top at one end.

The bases of the candlesticks are then screwed or taped to both ends of the 2 x 4 and the two electrical male plugs attached to a double plug. An extension cord supplies power to the Aid.

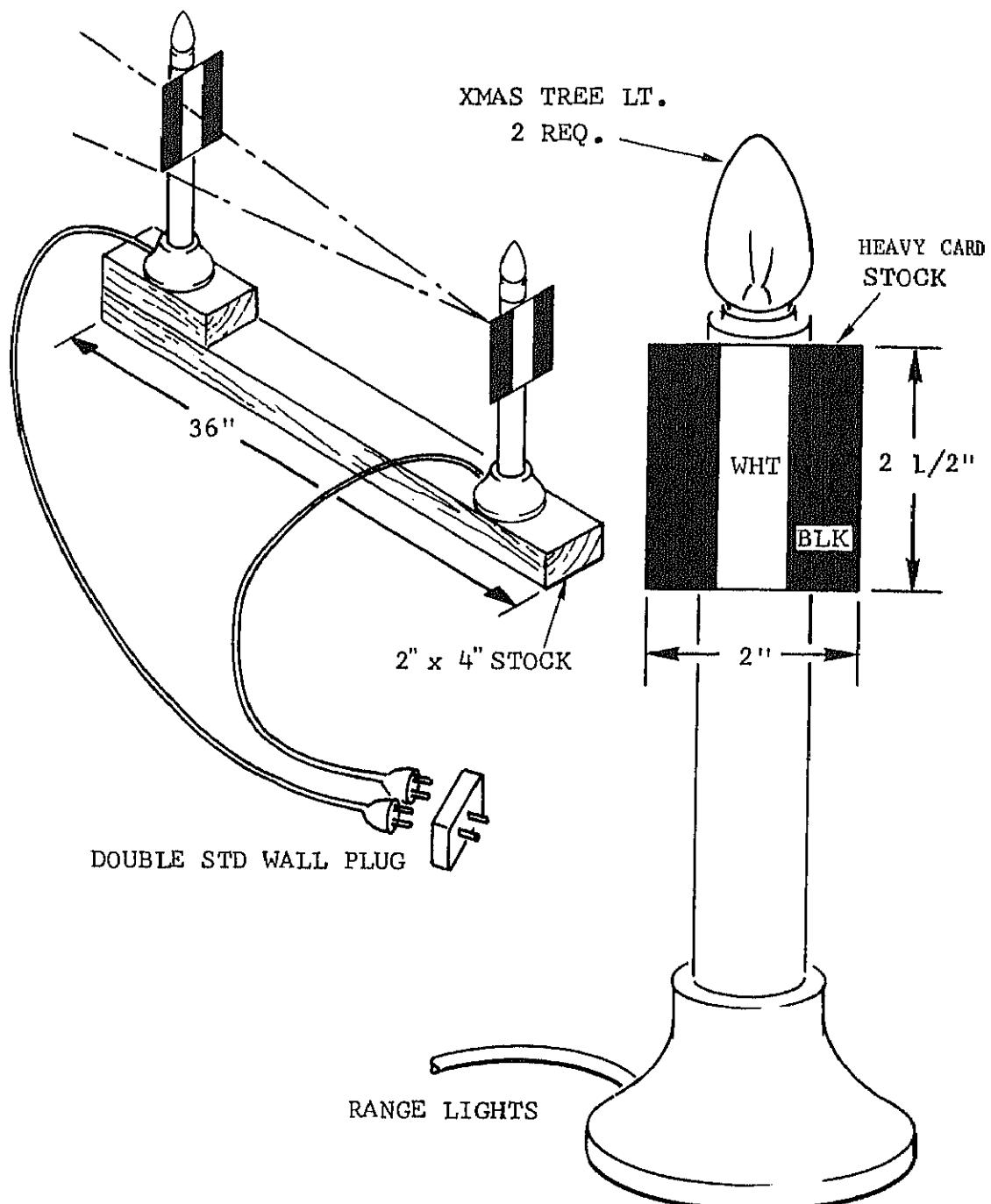
The daymarks are glued to the top of each candlestick. By holding the Aid before the class and moving it slowly to right and to the left the student observes the vertical alignment of both daymarks and lights as if he were at the helm of his vessel.

A local chart, posted on a wall, showing a range completes the concept. Chart TR39 is an excellent chart to use as it portrays a number of ranges.

Submitted by:

Ralph R. Hoffman BC-TSA

Range Lights



## Sling Psychrometer

Suggested Use:

Weather

The sling psychrometer described in this book is to be a classroom model for demonstration of the psychrometer principle only.

The materials needed for this demonstration are:

- (1) An empty box - can be saran wrap, aluminum foil box, etc.
- (2) Two Thermometers - identical, standard range - climate type
- (3) Round pencil paper clips and scotch tape
- (4) Gauze or absorbant cloth 1" x 3"

When constructing this psychrometer, mount the two thermometers in the 18" aluminum foil box. Cut the box as described and save the top for protection. Mount the thermometers observing the following:

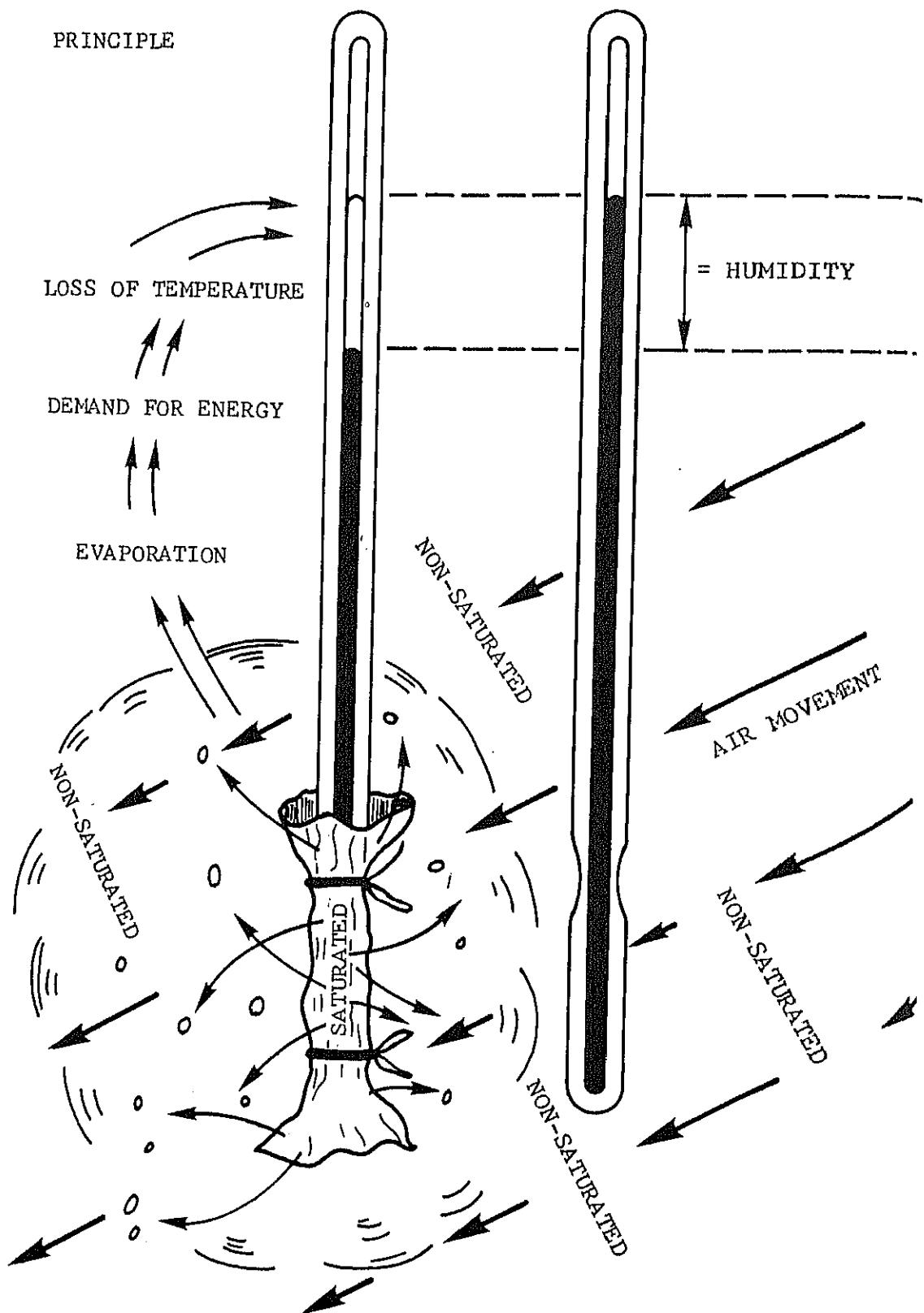
- (1) Attach thermometers securely - Mecury is highly poisonous
- (2) Attach thermometers in such a way that will allow easy reading. This will depend on the make of thermometer.
- (3) When mounting the wet bulb should protrude past the "dry" bulb.

Puncture a hole through the box as shown. For safety purposes, wrap a rubber band tightly around the pencil to protect the box from being catapulted off the pencil demonstration.

NOTE: Prior to the demonstration, practice with your device and review the principle function of this and other instruments commercially available.

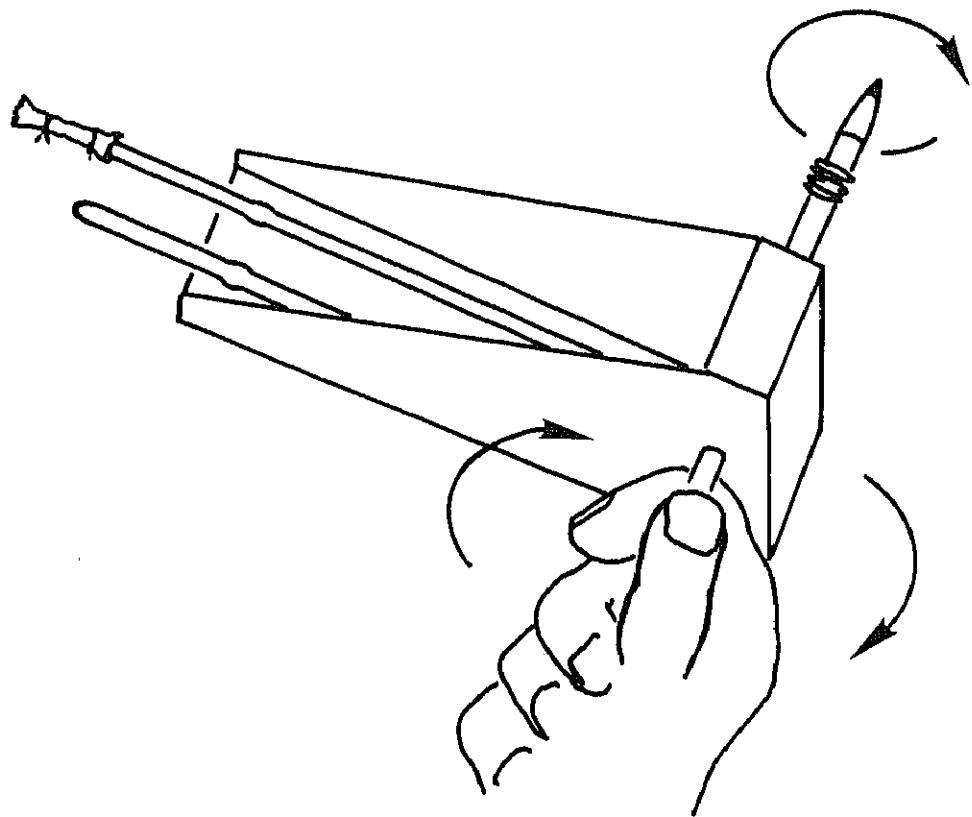
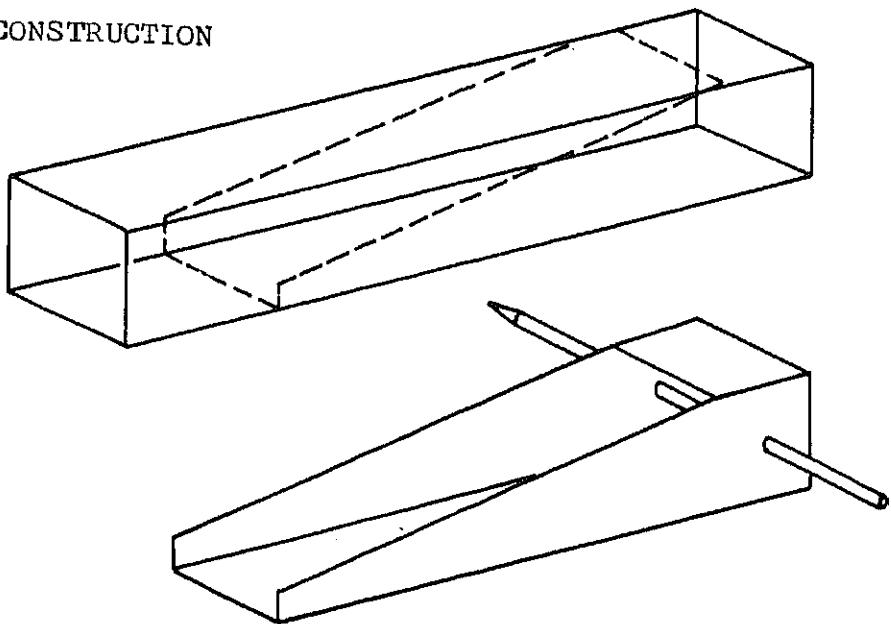
Submitted by:  
Paul Graf  
Flotilla 13 San Francisco  
Cost: Approximately \$3.00

### Sling Psychrometer

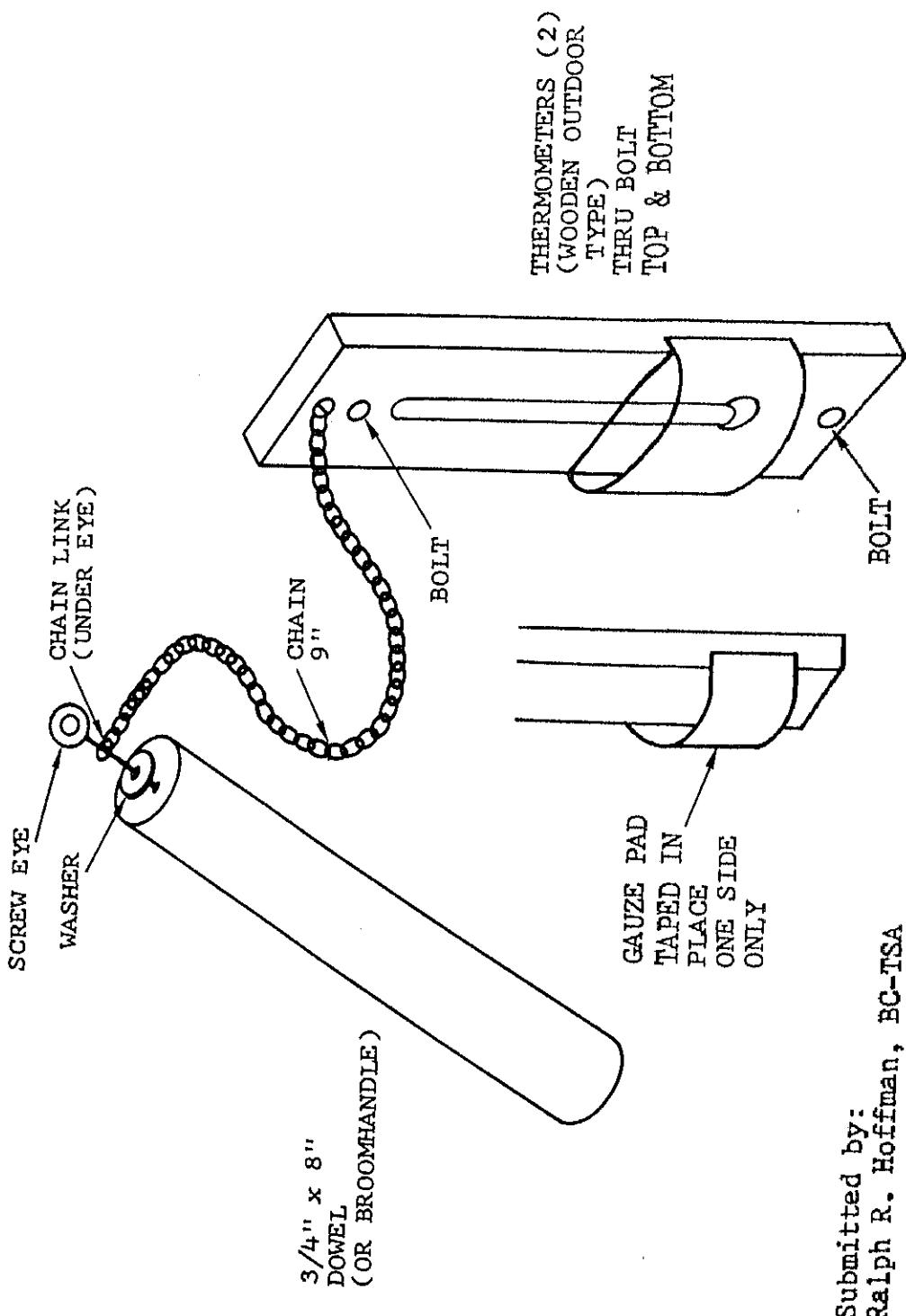


## Sling Psychrometer

### CONSTRUCTION



## Sling Psychrometer



YARDSTICK DANGER ZONE INDICATOR

and

CHALKBOARD BOAT OUTLINE TEMPLATE

Yardstick Danger Zone Indicator

A simple demonstration of the Danger Zone may be made by using three wooden yard sticks.

To make the device, simply lay the three yardsticks one on top of the other and drill a hole at one end through all three sticks. Pass a suitable size stove bolt through all three sticks and secure with a flat washer and wing nut to make the tension easily adjustable.

Open the Yardsticks and draw a line down the middle of the center stick. Paint the right (starboard side) of the stick green and the left (port side) red. Paint the top stick all green and the bottom stick all red. Thus when the middle stick is held vertically and the top green stick is drawn down to the right forming an arc of  $112\frac{1}{2}^{\circ}$  the Danger Zone is described and correctly colored green. The bottom red stick is then drawn down  $112\frac{1}{2}^{\circ}$  to the left to form the arc of the red light on a typical combination light.

Appropriate black lines are then drawn where the sticks overlap so that they may be quickly drawn down into position. Draw a black arrow near the top of the middle stick to aid in quick orientation. Notation may be made on the side of the right hand stick for example:

$$\begin{aligned}1 \text{ point} &= 11\frac{1}{4}^{\circ} \\8 \text{ points} &= 90^{\circ}\end{aligned}$$

Danger Zone  $90 + 22\frac{1}{2} + 112\frac{1}{2}$  arc  
Def: Danger Zone is from dead ahead to two points abaft the Starboard beam.

The above notations are for ready reference by the instructor.

The device may be held vertically to illustrate your Danger Zone or may be held by each student horizontally in front of him to visualize the arc of the Danger Zone on his boat.

Properly used this device has much teaching merit and can do much to clarify the difference between a crossing and an overtaking situation.

A further refinement would be to affix a small illuminated Combination light to the intersection of the three sticks to show the 112 1/2° arc of both the red and green lights.

#### Chalkboard Boat Outline Template

Simply draw an outline of the plan view of a boat hull on a piece of 1" thick wood stock, approximately 4" wide. Length of the boat may be approximately 10" to 12". Saw along outline drawn on board. Sand and varnish. Attach a screen door handle to the center of the device and you have a simple method for drawing the outline of a boat on a black-board.

The Danger Zone may also be indicated in green on the surface of the device and marked in points and degrees. A circular 360 degrees clear plastic protractor mounted on the keel line near the bow enables the device to illustrate the taking of bearings.

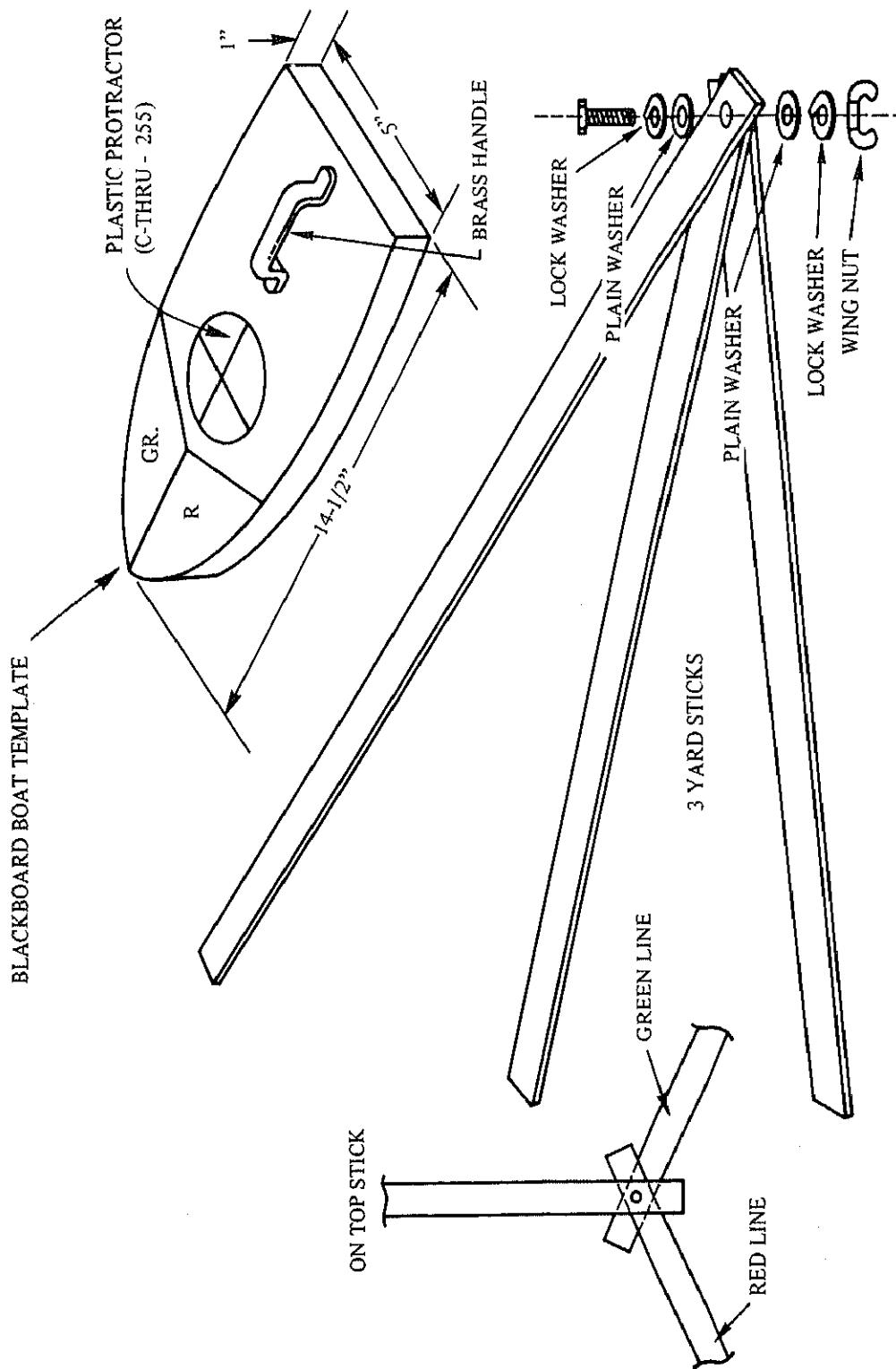
By holding the boat by the handle provided a very accurate and quick outline may be made on chalkboard or other surfaces when boat illustrations are to be made.

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Submitted by:

Ralph R. Hoffman BC-TSA

**Yardstick Danger Zone Indicator**



ARCS OF VISIBILITY FOR BOAT LIGHTING  
OR  
3 ARM BEARING PROTRACTOR

## DISPLAY BOARD

### Suggested Uses:

Rules of the Road  
Sailing Classes  
Many of the B.S. & S.  
12 lessons class.

Visual aids may be fabricated from scraps and materials found lying about in everyone's home, workshop or garage. Illustrated below is an easy to make, yet eye catching display board, brightly colored and covered with felt.

The models are simply sandpaper boats with felt glued on the back. The sandpaper will grip the felt on the display board when the boats are pressed against the board. They can be easily lifted off and replaced on the board in different positions, in order to demonstrate the Rules of the Road "situations".

Sandpaper diver's flags, rocks, piers, buoys, swimmers and even the old flotilla commander, may also be fabricated if you desire.

As you instruct and move the boats about, a very effective student attention getter is created for a portion of your talk. It should not be used for the full lecture, however. Just as we get tired of looking at the same old slide for two hours, your class will get bored looking at the same old board for two hours.

### Materials:

		Cost (if you must buy it)
1	Plywood panel 1/4" x 24" x 30"	\$1.00
1	Hinge 2" or 3	.50
	Sandpaper course(2 sheets)	.50
	Paint left over from boat	?
1	Stand 1" x 8" x 10 pine	.20
1	Buoy, wooded dowel-use broom handle	-
12	Felt squares 12' sq @ \$.10ea.	1.20
8	Wood screws and glue (scrounge around the garage)	

TOTAL                    \$3.40

Construction:

Step One: Cut wood pieces and install hinge. Paint all exposed surface light blue.

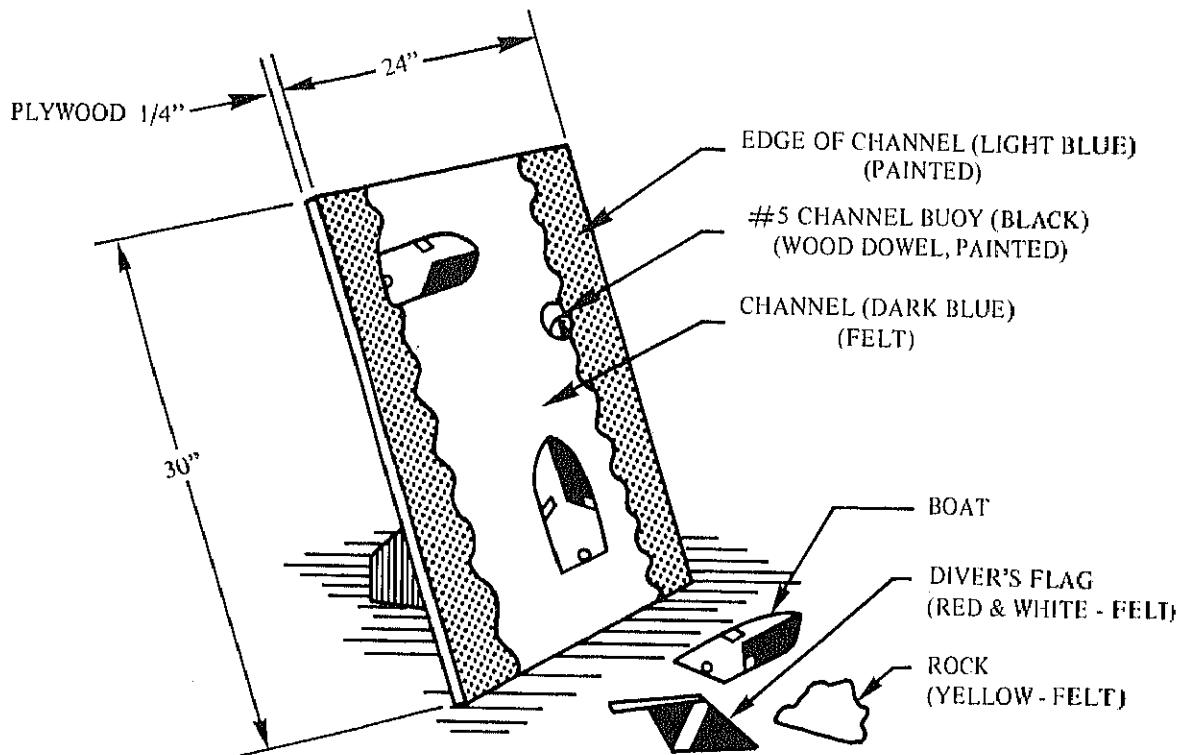
Step Two: After paint is dry, glue down the dark blue felt "Channel". When felt is dry or stuck well, you may affix the channel buoy. Glue and screw from back of board. If the buoy is cut on a slant it will demonstrate the direction of the current in your channel.

Step Three: Glue felt pieces to the smooth side of the sandpaper and cut out the boats with scissors. (This is supposed to sharpen them at the same time.)

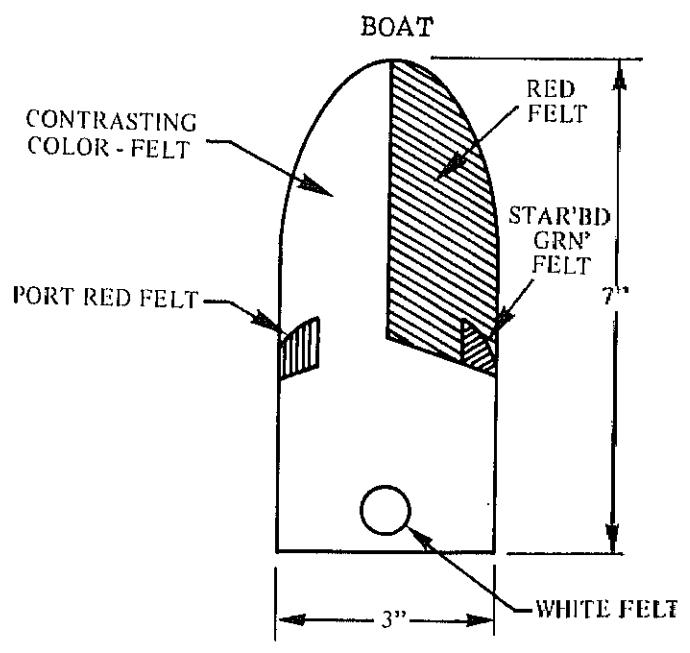
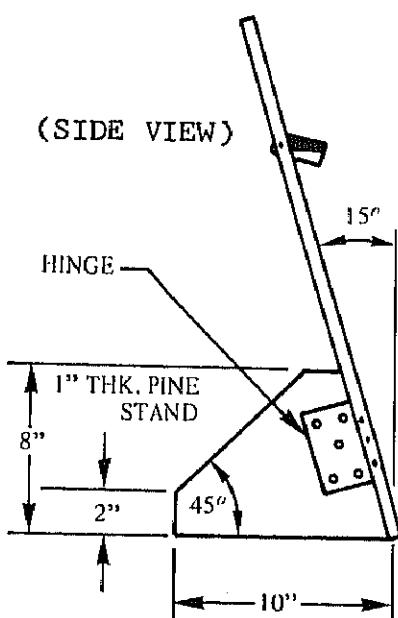
Submitted by:

D. Lemon  
Flotilla 19 Coyote Point

Display Board



RULES OF THE ROAD - MODEL DISPLAY BOARD



DISPLAY BOARD

(COARSE SANDPAPER BACKING)

## PART II

### Some Helpful Hints on the Overhead Projector

Some instructors use the overhead projector exclusively as a new kind of black board. Well, it is a lot more than that. The overhead projector is widely used and very popular in education today. Some instructors don't take full advantage of its potential. Limiting it to "electric blackboard" status doesn't make sense, if you know what it can do.

Overhead projectors provide instructors with some advantages other media cannot match. The O/P is designed to be positioned in front of the class. Consequently, you face your students while presenting so you can maintain eye contact, observe reactions and adjust your presentations accordingly.

O/P's can be used in a fully lighted room. Darkened rooms heighten problems of inattention, drowsiness and discipline. With the O/P, the instructor and students are completely visible to each other at all times.

The instructor runs the whole show. The O/P complements an instructor. You can use it to control the pace, selection, emphasis and review of any subject. There is no need for a special audio-visual operation. Your verbalizing and the overhead visualizing work together beautifully. Also, by turning the projector on-off, you can easily shift the students' attention where you want it.

The O/P is a very versatile medium. You can draw on a visual, you can project transparent or opaque objects. You can also use

handmade or professionally prepared transparencies and point out details of a visual as it rests on the O/P,

Instructors create their own transparencies. With a minimum of skills and materials, an instructor can prepare quality visuals to supplement professional ones.

Transparency making is easy and inexpensive. Equipment and materials are simple and inexpensive. A duplicate transparency can be produced from an original in just seconds. No more repetitive chalk board work. The result is more class time available for instruction and review.

Complex subjects can be presented step by step. You can break down a whole item into its component parts with the O/P techniques of overlays and masking. Then you are ready to present the subject comprehensively. Color can be used effectively and economically. O/P transparencies lend themselves to the use of color. Color helps students grasp distinctions, reconstructs reality and imparts esthetic and emotional values. Incidentally color materials cost about the same as plain black materials. O/P's can be operated by anyone. With a little time, patience and practice the O/P becomes an extension of the instructor. The machine is virtually damage proof. Students can use it to present their work (presentations) and to solve problems given them by their instructor.

You can address any size audience with an O/P. The O/P's large clear images make it adaptable to any audience. You're limited

only by the size of the screen and the distance you can be from it. O/P's combine all the best advantages of the visual media. They help focus student attention, aid in comprehension and improve retention.

The O/P is capable of performing many teaching tricks. Some of them are:

- (1) Developing charts step by step
- (2) Illustrating lesson objects
- (3) Summarizing results or responses
- (4) Locating places and events on maps
- (5) Outlining a lesson
- (6) Giving assignments
- (7) Asking questions
- (8) Reenforcing memory
- (9) Testing and reviewing
- (10) Emphasizing announcements
- (11) Facilitating class participation
- (12) Make all kinds of meetings more effective

Now that you know what the O/P can do read on to find out how these transparencies are made.

#### Constructing the Transparency.

Projectural visuals may be drawn on clear acetate. An india ink drawing pen should be used for permanent drawings. If you are not an artist, acceptable transparencies can be made by tracing overdrawings or illustrations from books, magazines, etc. Drafting

aids such as a circle, diamond, triangle and square templates, french curves, lettering guides and rub-on letters and symbols to name a few are available at a reasonable cost from art supply stores. A little care with a minimum of talent can produce excellent transparencies by this method. They can be made in several colors, using colored inks. The clear acetate is available from many sources including art supply stores and large chain department stores.

Projecturals may be made by various photo copy processes such as Diazo, Ozalid, Xerox and 3M. Each manufacturer has detailed instructions for his process. Relatively inexpensive film is available for black on clear, black on colored background, color on clear or white on colored background transparencies. Using the manufacturers instructions good color or black and white transparencies can be made. Special film is available for producing half-tones, such as photographs. Caution must be observed that the film used is suitable for the copying machine available. Not all machines use the same type of film.

The Ozalid process makes excellent copies, the image to be reproduced is drawn on translucent paper. The special ultra-violet sensitive film comes in many colors. The equipment necessary to process the film is found in many architects' and engineers' offices. It can also be used at home using sunlight, or even a photo-flood lamp, to provide the ultra-violet light source. The image is developed by exposing the film to ammonia vapor. This can be accomplished by placing a spoonful of ammonia in a large pickle jar with cover and allowing the ammonia to vaporize in the jar by slightly warming it. The exposed sheet is then inserted loosely in the jar to allow the vapor

to reach all exposed areas.

Ozalid makes fine reproductions on solid colors. Stronger copies can be made if the original is backed with a reversed yellow "carbon" paper.

Good lettering is very important on an overhead projectural. The larger the lettering, the better. Generally, lettering should not be less than 5/8" in height. Try rub-on lettering. Many different styles and sizes are available from drafting supply or art stores. Rub-ons are very easy to use. Merely choose the correct letter, place the sheet over your artwork and rub it thoroughly with a ball point pen. After the letter is completely transferred in this way, it should be "fixed" by placing the waxed paper protective sheet which comes with the lettering over the transferred letter and burnishing it with a ball point pen. Protective sprays are also obtainable from artist supply houses.

#### Framing Your Transparencies

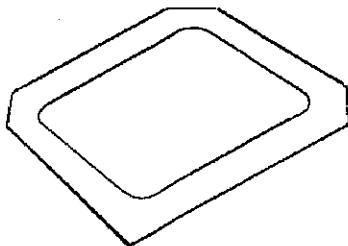
Transparencies may be projected unframed, but there are a number of reasons for framing them. A frame will block out light around the edge of the transparency so the students to understand the idea being presented. The instructor is in effect, withholding facts until they have meaning to the students.

To add overlays properly, mount your base transparency on a frame face down. Turn the framed transparency face up. Now mount the successive overlay transparencies face up.

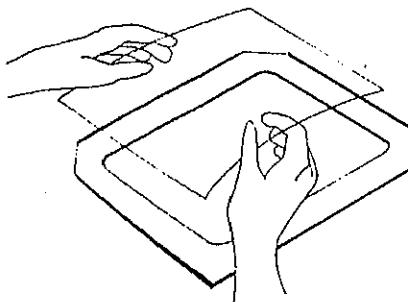
Hinge the film at only, one edge with tape. Make sure the register marks in the upper right hand and lower left hand corners of the base match all the elements of the overlays. Usually, no more than two overlays are used in building an effective visual projectural. After the overlays have been mounted, the assembled projectural is ready for projection.

Insert figures for adding overlays here that only the image will be seen when projected. A frame also provides a study base for ease in handling and storing. It makes a convenient border for writing notes relating to the subject of the transparency. This can be extremely helpful to the instructor during the lecture and presentation. Finally, it makes an excellent base for adding overlays.

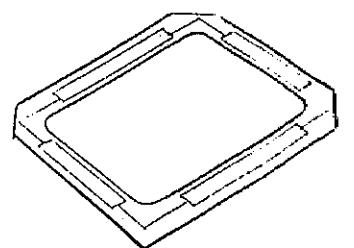
To properly frame your transparency, lay a frame face down on a flat surface and place transparency, also, face down over it. Make certain the transparency is centered on the sides of the frame then tape it in place with transparent tape along all four sides.



Lay frame face down  
on a flat surface.



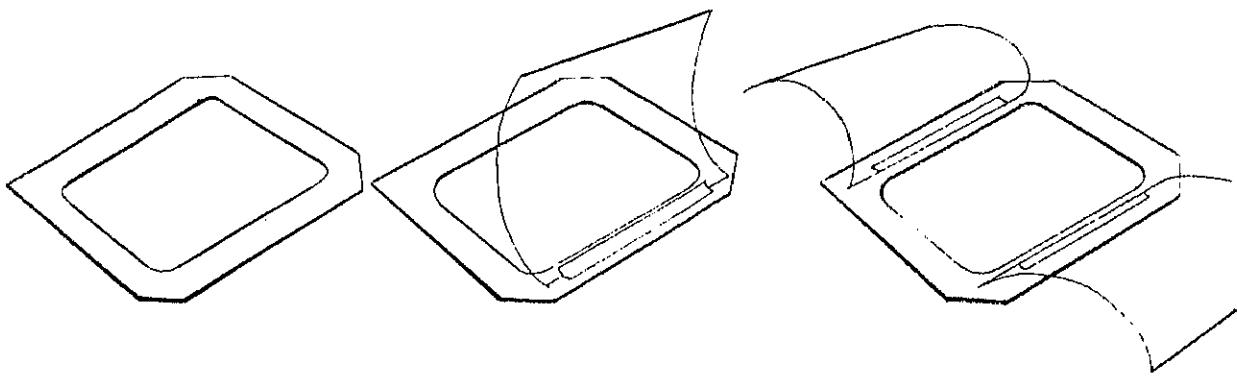
Center the transparency  
on the frame.



Tape all four sides.

### Adding Overlays

Overlays are used to add information to the base transparency. They are additional transparencies which will help make up the complete visual aid. An instructor can use them to build his idea a piece at a time. Using this method will help.



Base transparency is mounted on a frame.

The second transparency is centered over the first and taped along one edge.

The most effective transparencies contain no more than two overlays.

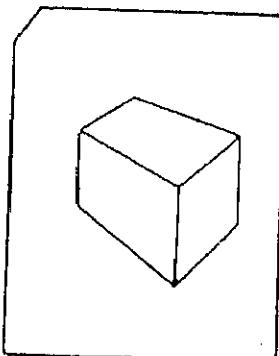
### Color Presentation

There are three ways to add color to your transparencies. Color adds drama. Its use for providing variety and impact cannot be over-emphasized.

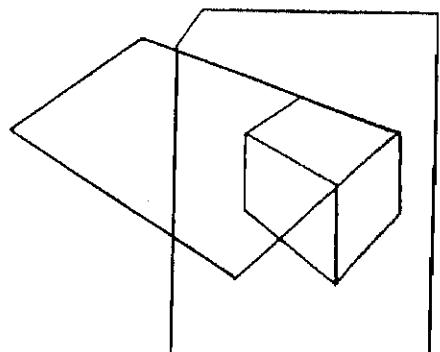
The first and simplest way to add color is with felt marking pens. There are two types, water soluble and permanent. The water solubles color can be removed by applying a damp cloth to the transparency. The instructor can also apply the color while he showing the transparency. The permanent type marking pens are preferable for projecturals which will be subjected to frequent use.

The second method is to reproduce the original in-color film as mentioned earlier in this chapter. Consider using color film for overlays and black or clear for the base transparency. The effect is dramatic, particularly when several different color overlays are used.

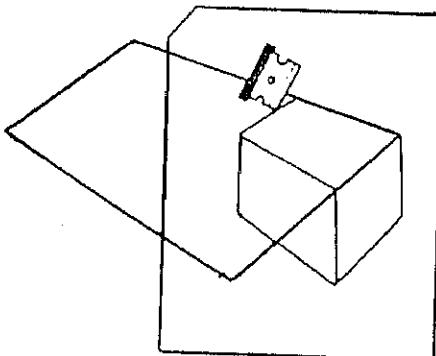
The third method involves the use of adhesive backed transparent color film available from many sources. One of the best is 3M type 7220 film or similar brand, available in blue-yellow pink orange, green and red. It is applied by peeling the color film from its backing and placing the adhesive side of the film over the backside area of the image you want to color. Carefully work out all bubbles and wrinkles. Carefully cut away excess color film with a razor blade. Be certain that you cut through the color film and not the transparency. Peel off the excess color film, rub the edges of the color film firmly in place. You now have a colored transparency. You may use several colors if you desire, but bear in mind too many colors can be distracting.



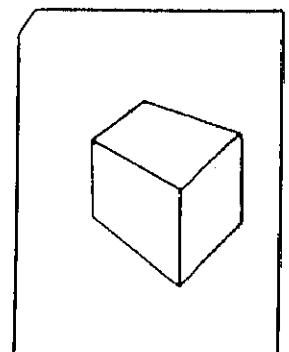
Lay base transparency face down on a flat surface.



Position film over the imaged area.



Cut around imaged area with a razor.



Remove excess film.

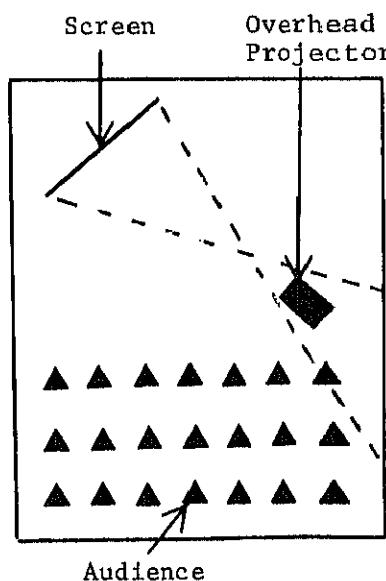
## O/P Principles to More Effective Instruction.

Plan ahead - Never use the o/p without a specific purpose in mind. Develop your material before class but be flexible as you present it. The o/p allows for plenty of flexibility. Use this checklist or one similar for lesson preparation:

- (1) What lesson parts are important enough to visualize?
- (2) What aspects of the lesson may be unclear?
- (3) How can diagrams or charts be used to explain difficult points?
- (4) How can the o/p be used to actively involve the class?
- (5) Would write-on techniques make some visuals more effective?
- (6) Would some alternative medium work better than the o/p?
- (7) Should media other than the o/p be used?

Write legibly and large - Many presenters use letters that are too small and too weak to be effective. Letters should be approximately 2 1/2" high, for every 32 feet from the screen. Make letters strong and bold. Don't cram ideas together. Be concise. Turn the projector off when not in use and between transparencies.

Give everyone a front row seat. Locate the screen so everyone in the room can see it clearly.



Position the screen as high as possible and tilt it forward to eliminate "Keystoning" of the projected image.

Use simple, graphic drawings. Simple figures that get the idea across are what you want. Don't stop instructing to put complicated illustrations on the visual. Prepare them before class.

Stimulate Curiosity.

Use the revelation technique (covering the items with a sheet of paper and revealing them one at a time) to avoid distractions and keep the color class interested.

EMPHASIZE. Use color, capitalization, underlining, circling or boxing to make key points stand out.

### PART III

Part III of this manual deals exclusively with the Visual Aids that are more elaborate in their construction and therefore more expensive to construct. They, like the simple, inexpensive aids in Part I & II serve one common purpose, to "aid" the user in the instruction of some course or topic.

How can this help you? You may wish to copy some of the aids presented in this manual and use them yourself. On the other hand, some of these aids may give you ideas of your own, enabling you to construct an aid of your own design.

When making your visual aid, use your imagination. Remember all the questions that were asked regarding the topic you were teaching, then go ahead. Before trying your aid in class show it to others instructors to get their opinions. Remember, if you are going to invest a lot of money in a visual aid, plan well and make your investment pay off.

## RUNNING LIGHTS DEVICE

### Suggested Uses:

Aids to Navigation  
Piloting  
Seamanship

By the use of this device, it allows the correct lighting of all classes. of boats, under both Inland and International Rules can be demonstrated.

The following is a list of the individual lights that can be switched on separately or in combination with others to cover all required lighting combinations.

Switch #1 Combination light

#2 20 point white light forward

#3 Anchor light-32 point stern light

#4 Red and Green side lights

#5 12 point white stern light

The device is mounted on a sheet of 3/8" plywood. This base could be formed in the shape of a ship's hull. Dimensions of the base are 17" x 36".

On the center of the board is constructed a box 8" x 12" which contains an Eveready #731 Heavy Duty 6 volt battery. The top of the box is covered with 1/8" thick plexiglass drilled for the four round head wood screws that attach to it. Five single throw single pole toggle switches operate the lights and are marked with embossing tape for easy selection.

All switches to the lights are wired in series to the battery within the battery box.

A full size Combination light is mounted at the front center of the board. A short distance behind it is the 20 point white light forward mounted on a vertical iron pipe 7" above the base flanged to the base board.

The 10 point red and green separate side lights are mounted on the port and starboard sides of the battery box amidships.

Six inches aft of the battery box is a 32 point white light mounted on a vertical iron pipe flanged to the base board.

Mounted at the rear of the board on a wood block 2" high is the 12 point white stern light.

All lights (with the exception of the 10 point red and green side lights) are mounted on the longitudinal centerline of the rectangular base.

All lights are standard marine running lights available at most marinas. The mockup is sturdy although somewhat heavy. It weighs about 22 pounds.

In a semi-darkened classroom, these lights are very effective and the large size of the device gives the illusion of an actual boat passing in different directions.

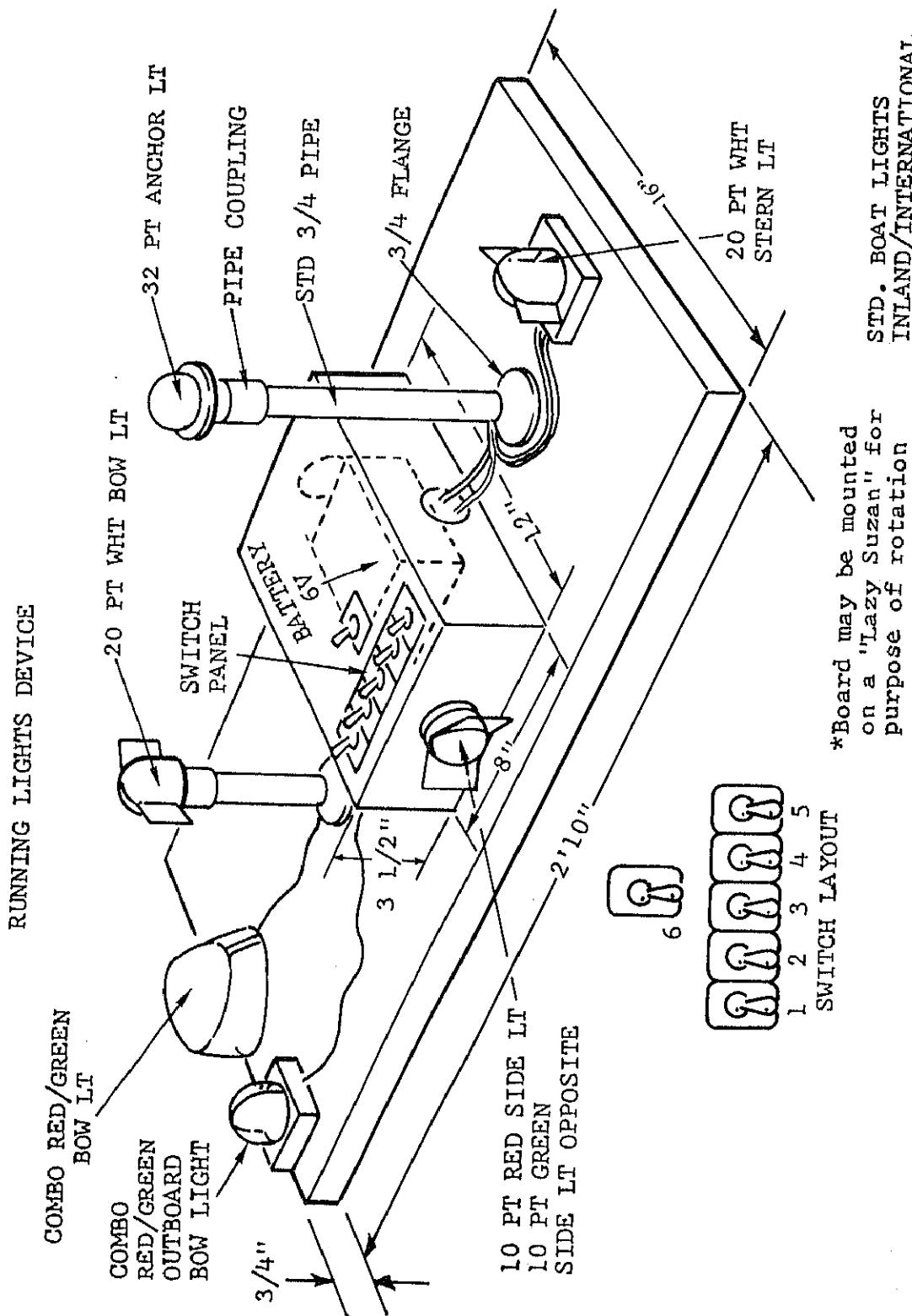
The mockup may be held vertically by the instructor to portray the arc of the danger zone.

When held at eye level horizontally and turned slowly in various directions by the instructor, a complete explanation of the running lights of all boat classes and how they appear on the water can be displayed.

\*\*\*\*\*

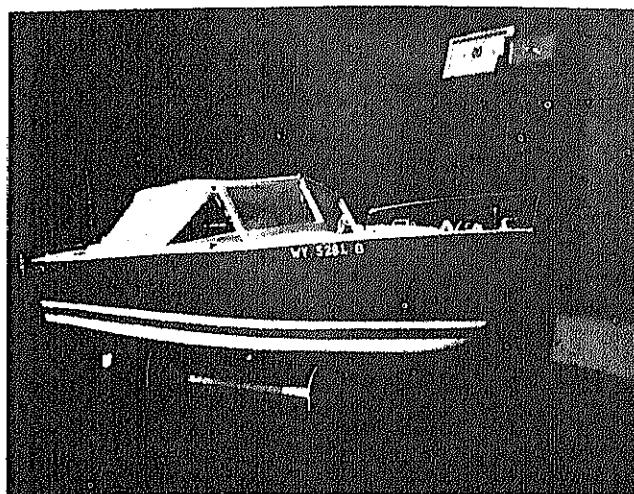
Submitted by:  
Ralph R. Hoffman BC-TSA

Running Lights Device

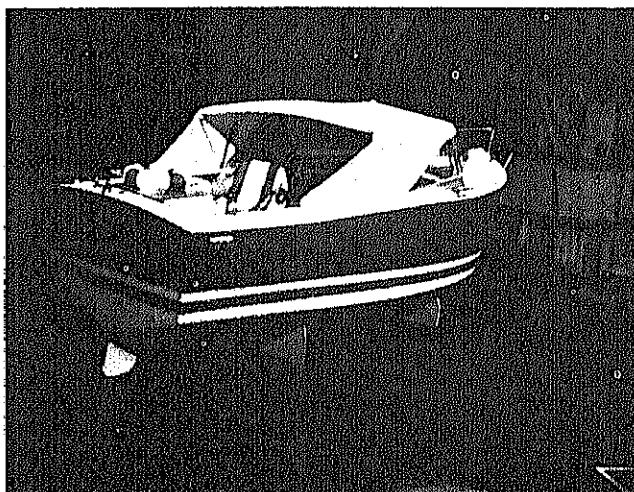


MODEL BOAT

**Suggested Uses:**

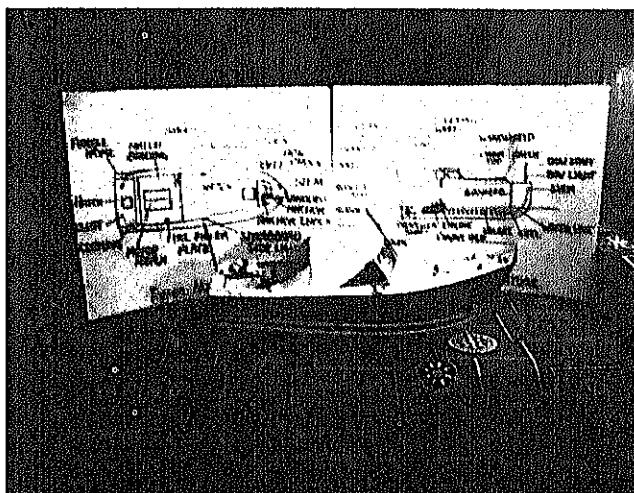


This model is complete with Personal Flotation Devices, ring buoys, paddles, anchor fire extinguishers, ventilation system and railings.



It is wired so that the approved lighting system for various lengths of boats can be demonstrated one at a time. Anchor light operates separately.

The rudder moves to demonstrate boat handling. Labels indicate "bow", "stern", "port", "starboard", etc.



Submitted by:

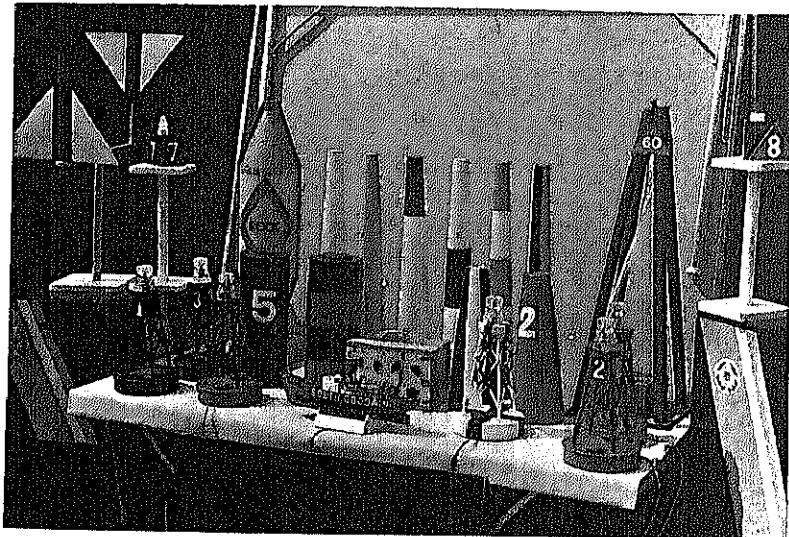
William Blount  
Flotililla 74  
Green River, Wyoming

Cost: All parts donated

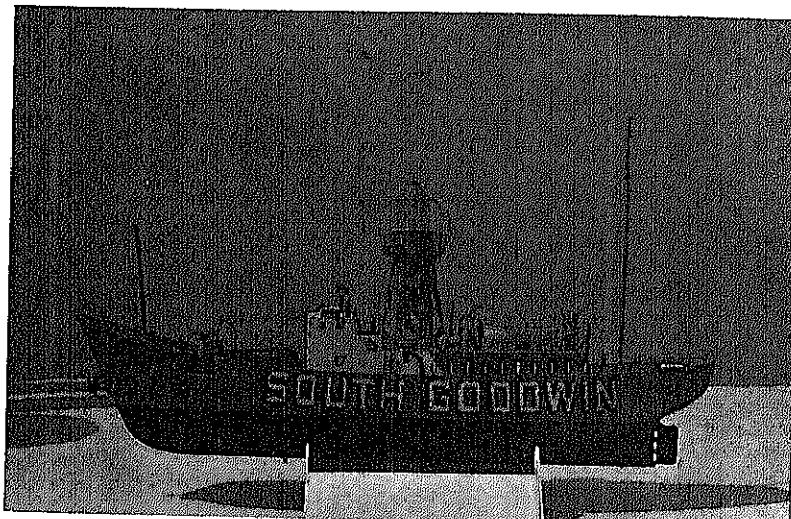
## MODEL AIDS TO NAVIGATION

Suggested use:

Aids to Navigation



The training aid set includes hand-made models of the most frequently encountered Aids to Navigation on the Pacific and Atlantic Coasts and in the tributaries emptying therein.



A plastic model lightship is used in the discussion of Lightships and Lighthouses.

The ship's main light is wired to illuminate.

"South Goodwin" is an English lightship positioned in the English Channel.

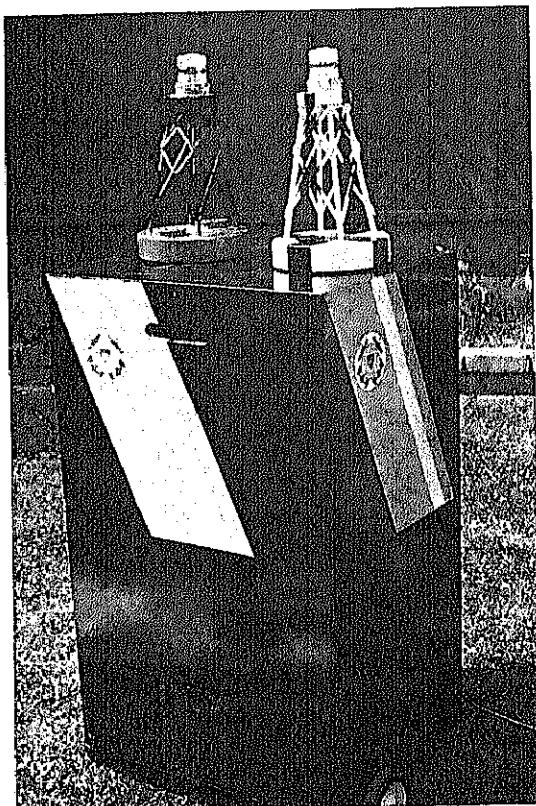
Switch console submitted by:

Dick Moberly, Flotilla 35  
Cost: Approximately \$18.00

Submitted by:

Frank Palmer  
Flotilla 35, Sacramento  
Cost: Approx. \$50.00

## Model Aids To Navigation



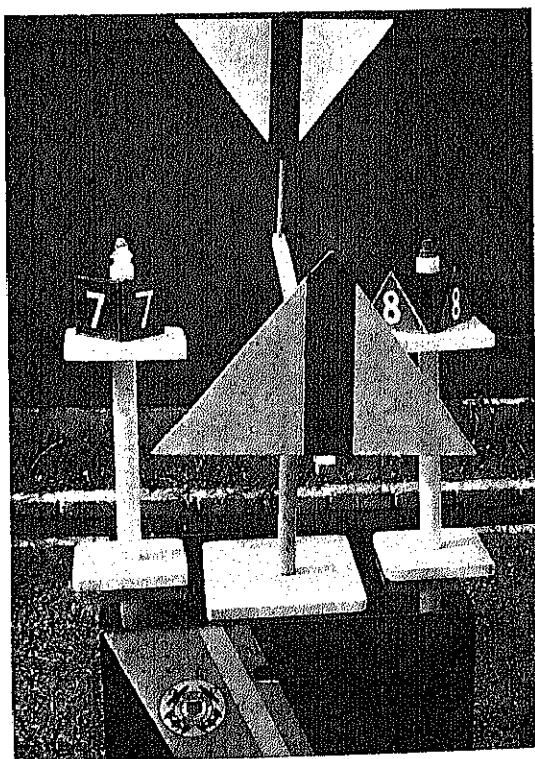
All training aids in this set fit into two portable boxes, which were built to accommodate them.

The boxes are built of 1/2" plywood and 1/2" particle-board.

The boxes are painted black with the Coast Guard stripes as a buoy tender is painted. Auxiliary decals finish the color scheme.

The boxes are fitted with wheels for ease of handling.

Also carried in the boxes are the charts used in the class chalk thumb tacks, tape, spare lamps, extention cord, glue and easels.

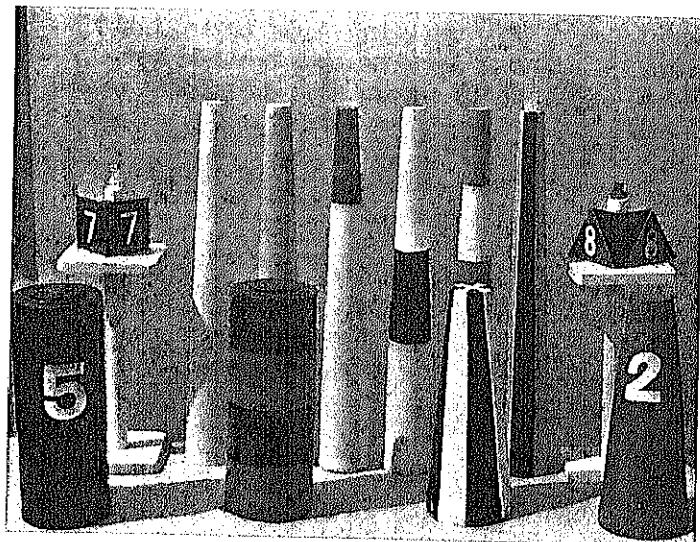


These aids can be disjointed for more compact storage in the boxes.

Shown here is a model range and a pair of Deep Water Channel markers.

All aids are colored according to the color scheme used in the Coast Guard Aids to Navigation System.

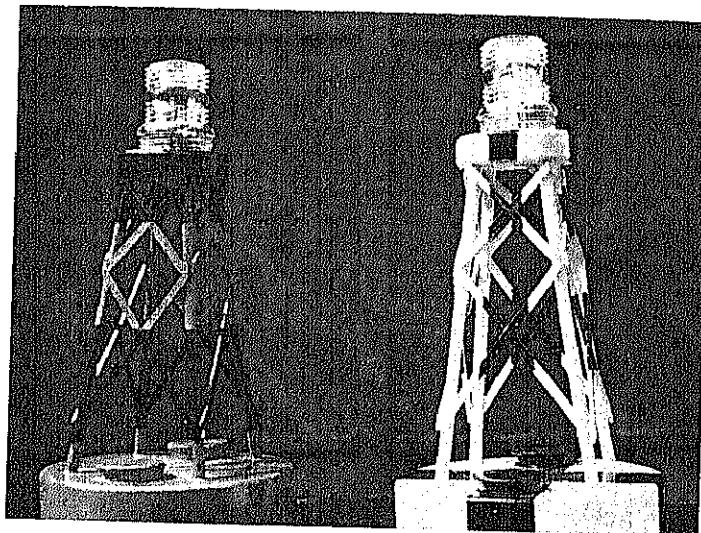
## Model Aids To Navigation



All models shown here, except #7 and #8 are made of redwood and were turned on a lathe.

Less heavy aids can be made of colored poster board formed around and fastened to pine or fir discs.

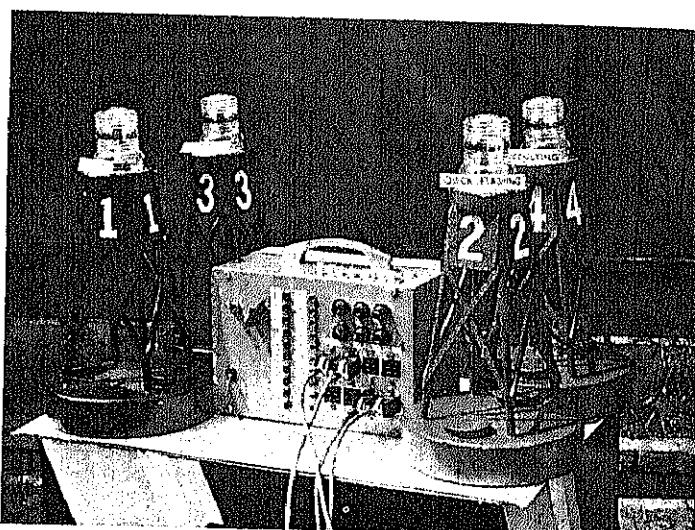
#7 and #8 aids are made of 1 -1/8" dowel and 1" pine shelving. Number boards are made of 1/8" plywood.



Lighted buoys are controlled from a console box constructed by a flotilla member familiar with such wiring.

The console box uses wafer and three position switches, as well as a small motor eleven position switches and fuses.

Each lighted buoy has a separate four wire cord which plugs into the console.

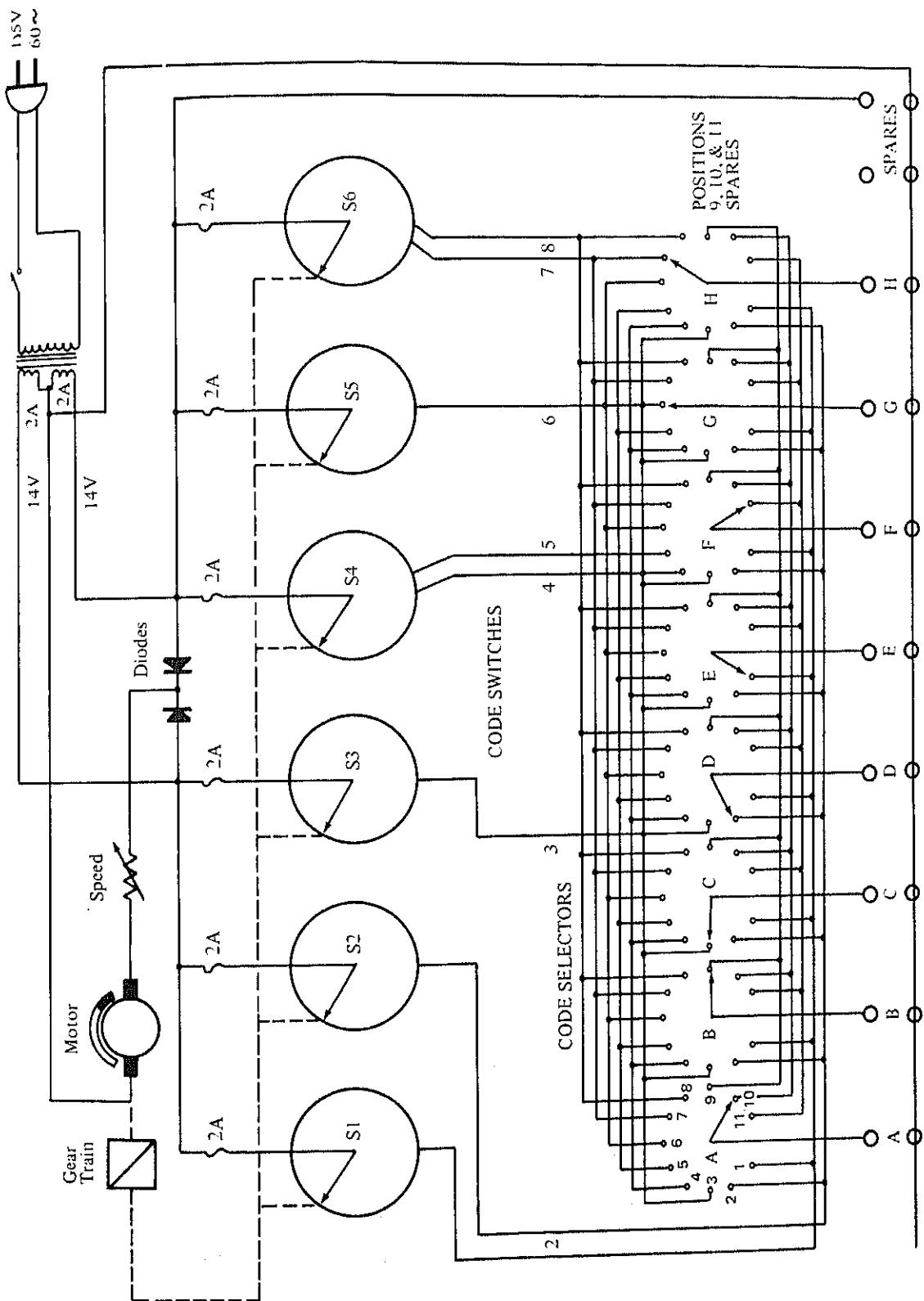


Lighted buoys measure 13" high and the bases are 7" in diameter and 1-1/2" thick.

Three of the vertical uprights are 5/16" dowels, the fourth upright is a 5/16" plastic hollow tube. The wiring runs thru this tube to the light sockets in-side the fresnel lens.

The lens is an all-around stern-light lens, Perco #P-248. Light bulbs are CM1820 28 volt, .10 amps.

### Aids To Navigation Console Box



Moriches Bay Galvanic Action and Electrolysis Demonstrator

The switches to be used are single pole, double throw, center off toggle type, with labels placed above and below to show Cadmium-Aluminum; Cadmium-Copper; Plastic sheath; and frayed and cut cloth and rubber sheath.

Glass jars are standard 4" diameter lab jars 1 3/4" deep.

Electrodes are strips of metal, bent into "U" form, to clip over lip of jars. Wires to these are fastened with small machine screws and nuts.

Meters are standard micro and milliampere panel type. For Galvanic action a range of 0-100 micro-amps; for Electrolysis a range of 0-50 or 0-100 milliamps. Suggest they be not less than 3 1/2" - 4" square face for easy visibility.

Base may be of wood or plexiglass, approximately 10" wide, by 17" long with holes cut out to receive the lab jars. These may be held in place with masking tape across the bottoms to the underside of the base.

Meters and switches are mounted on an upright backboard of aluminum, or a thin plexiglass, at a slight angle backwards, for best visibility from a distance.

Battery is a standard D" cell held in a single battery holder, available at supply houses, or may be formed of stiff aluminum.

Instructions for use that is a description of the action to be seen; and at least a description of part of the Galvanic series should be typed up and pasted to the base board for ease of demonstration.

Note: if Cadmium is not available plain or galvanized steel may be substituted.

Wires for Electrolysis action are: 1, a good unbroken plastic sheathed #14 copper single conducting wire; and 2, a frayed and cut cloth and rubber insulated #14 single or stranded wire. Wires are formed into coils within the jar, to present more exposure to the salt solution.

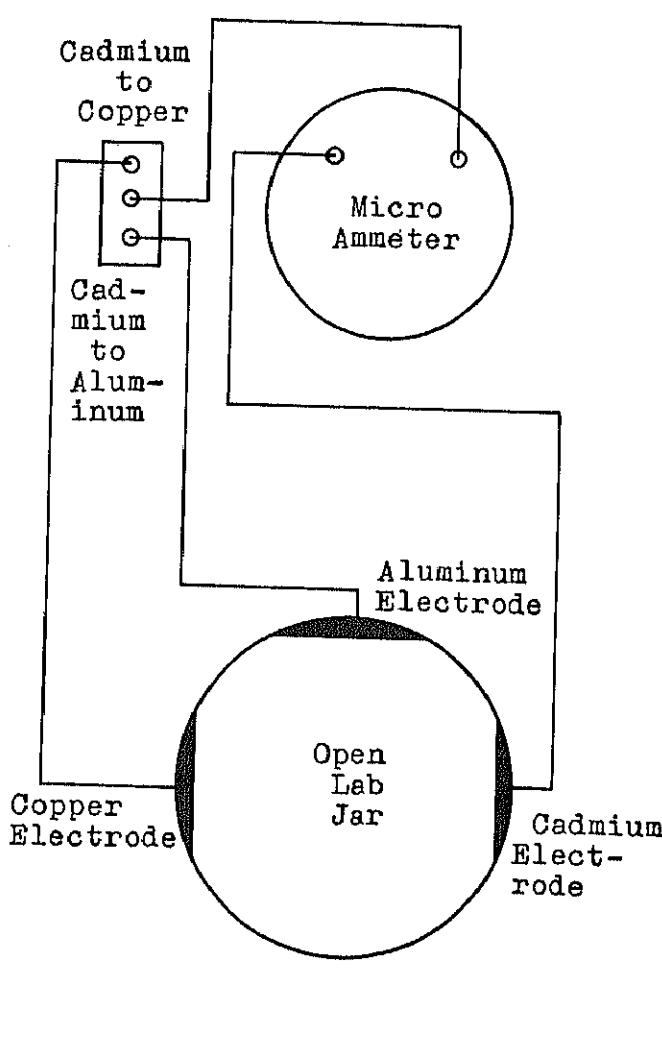
Operation is to put plain tap water in both jars, throw the switch for Galvanic action to the Cadmium-Aluminum position; little or no reaction will result. Repeat to Cadmium-Copper again little or no reaction. Add a small amount of salt, to be determined by experiment, and stir. Repeat switch throws and note small current flow from Cadmium-Aluminum, as opposed to greater current from Cadmium-Copper position. The reason of course is the greater separation of Cadmium and Copper in the series. This shows the need for an electrolyte to be present for galvanic action.

For Electrolysis, again start with fresh tap water in jar. Throw switch to plastic sheath position; no reaction. Throw to frayed and cut insulation, still no reaction. Add salt, stir and throw switch to plastic sheath, still no reaction. Throw switch to frayed and cut insulation and needle of meter will indicate current flow from the impressed battery voltage, showing the need for both an electrolyte and stray current to be present for electrolysis.

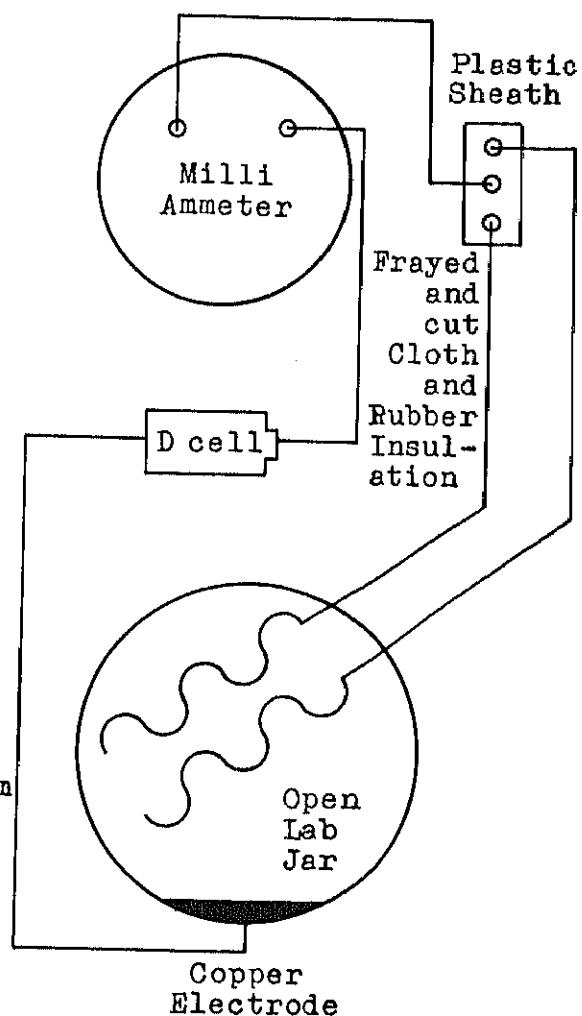
This demonstration is a simple graphic method of showing the difference between Galvanic Action and Electrolysis, and aids the instructor in separating the two terms, which are often used in error.

Schematic Diagram  
for  
Moriches Bay Power Squadron  
Galvanic Action &  
Electrolysis Demonstrator

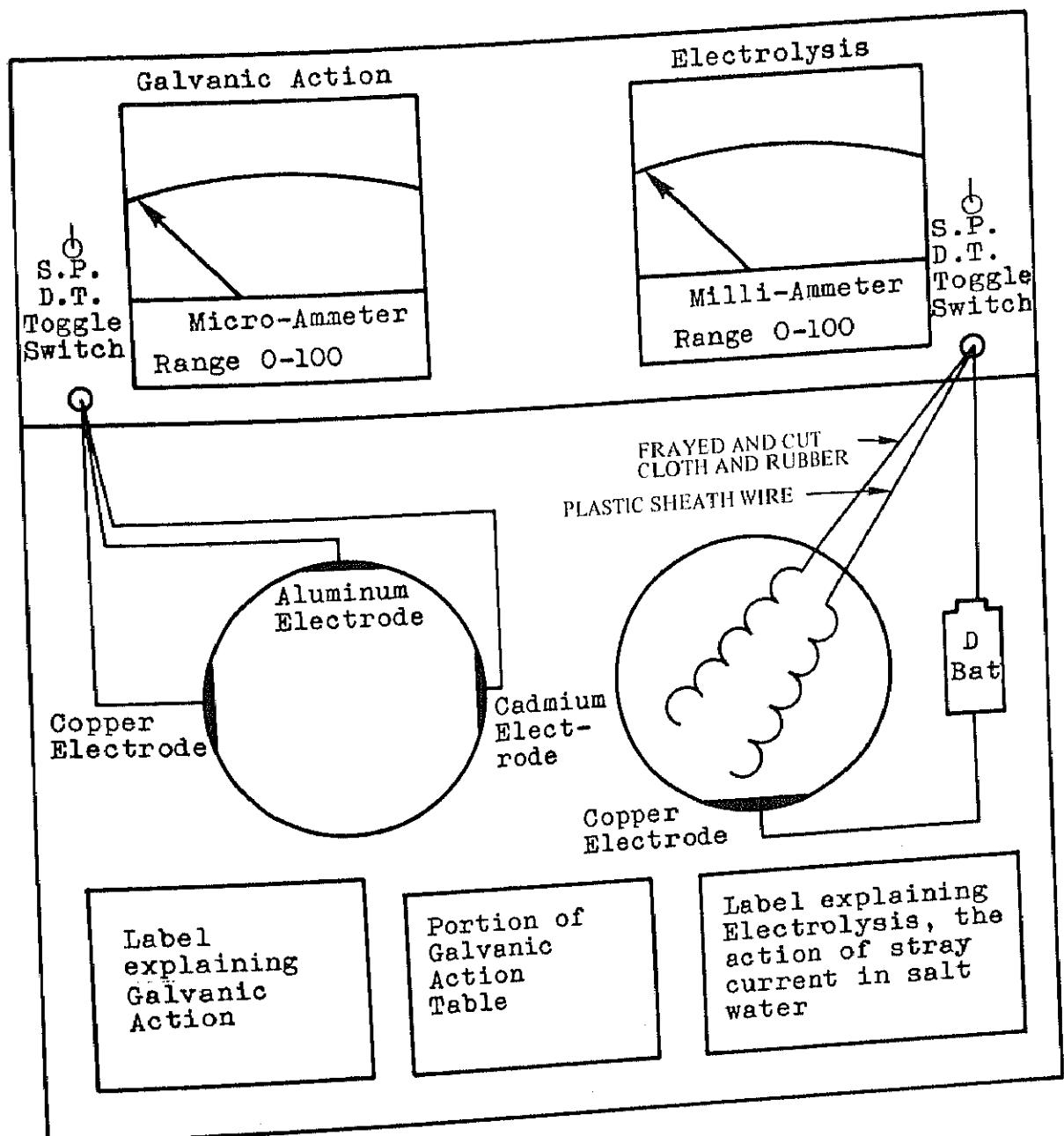
Galvanic Action



Electrolysis Action



Lay Out Diagram  
for  
Moriches Bay Power Squadron  
Galvanic Action and Electrolysis Demonstrator



This chalkboard is used with a tripod made of 1/2" thinwall conduit and can be set up on a table or bench. It is easy to carry and set up. The sound effects and lights can be very effective.

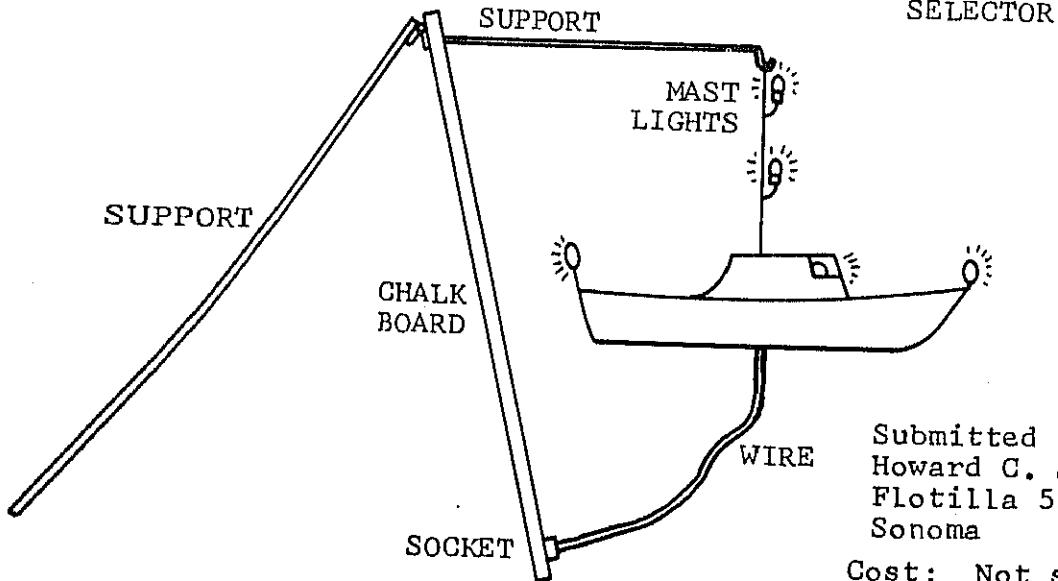
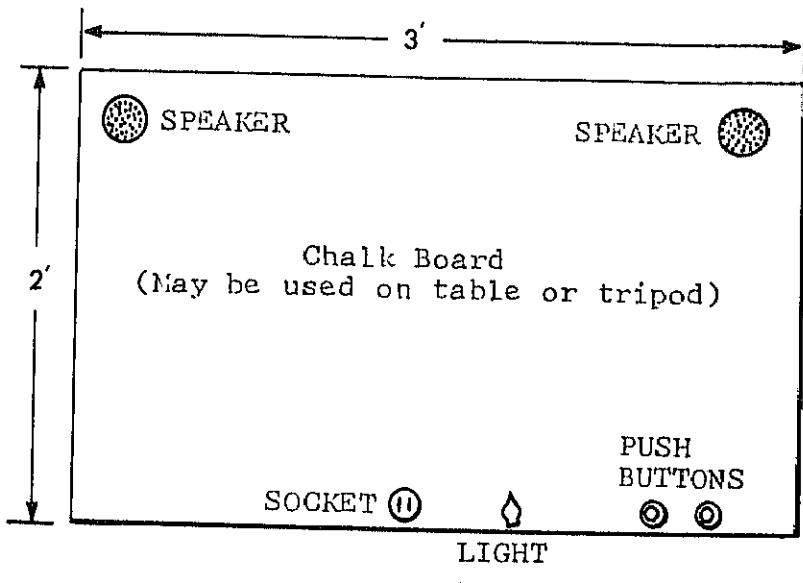
#### SOUND-SIGNAL AND RUNNING-LIGHT MAGNETIC CHALK BOARD

The magnetic boats are cut out of thin aluminum sheet with ALNICO magnets cemented to them.

The suspended (lighted) boats are plastic toys with lamps and wiring added.

#### Suggested Uses:

Boat handling  
Aids to Navigation  
Rules of the Road  
Search and Rescue  
Maneuvering



Submitted by:  
Howard C. Speulda  
Flotilla 52,  
Sonoma

Cost: Not submitted

## SOUND SIGNAL-CHALK BOARD cont.

### RUNNING LIGHT CIRCUIT- MAGNETIC CHALK BOARD

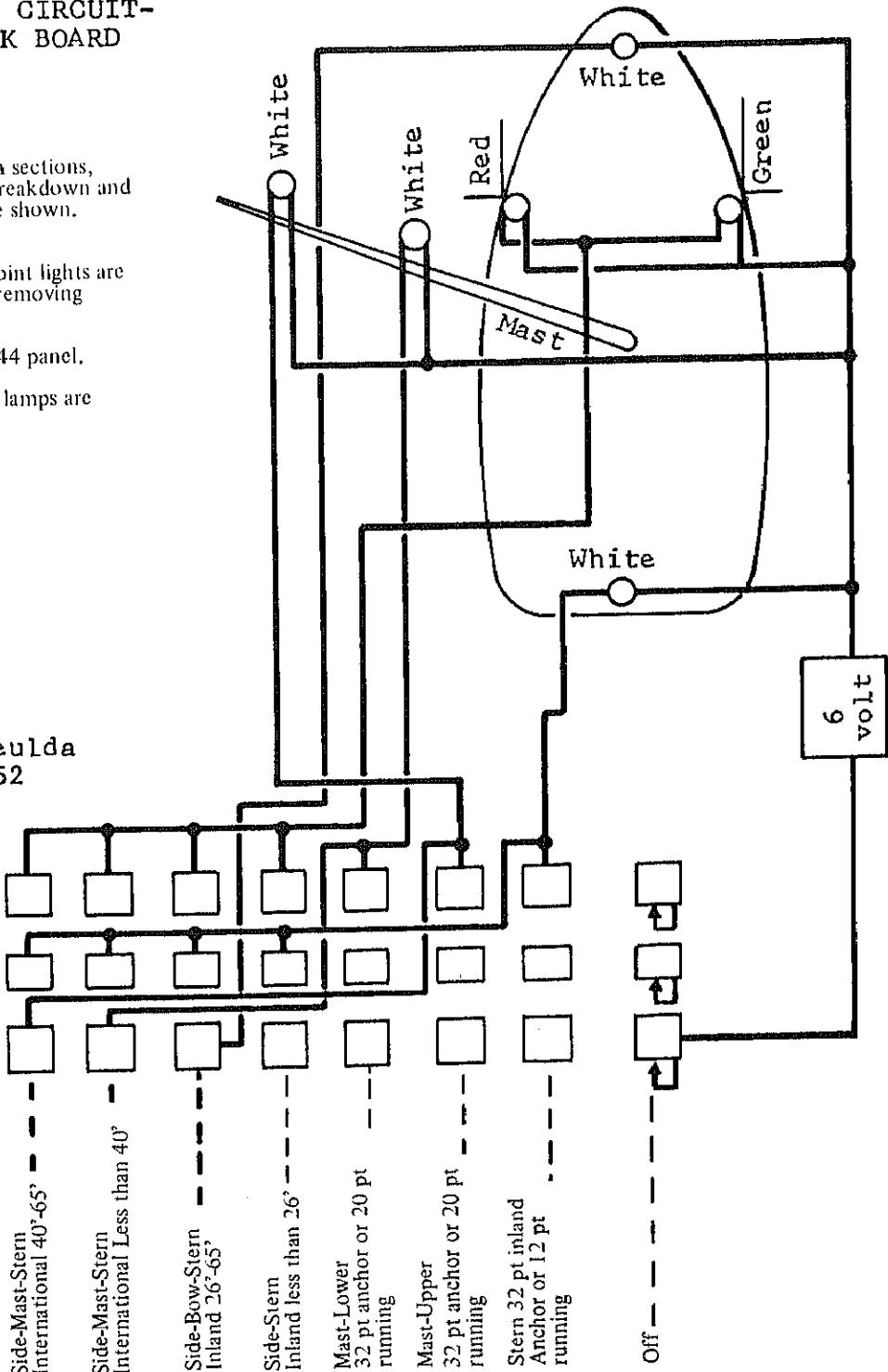
By addition of switch sections, Combination, Sail, Breakdown and Towing lights may be shown.

10, 20, 12, and 32 point lights are shown by adding or removing light shields.

Lamps used are No. 44 panel.

No sockets are used, lamps are soldered to wires.

Howard Speulda  
Flotilla 52



Sound Signal Circuit-  
Magnetic Chalk Board

SOUND SIGNAL-CHALK BOARD

Purpose: to give appropriate sound signals with Rules Situations.

Parts are taken from junk transistor radios.

Speakers are typical 8 ohm min.

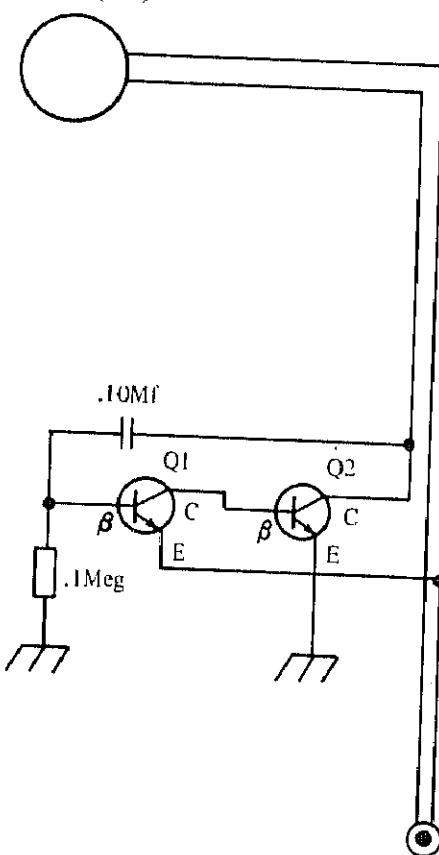
Battery is 1.5 volt

Q1 is RCA 40309 or equivalent

Q2 is RCA 2 N 2869 or equivalent

The two circuits are composed of identical parts but came up with different frequencies, giving the effect of two boats signaling each other.

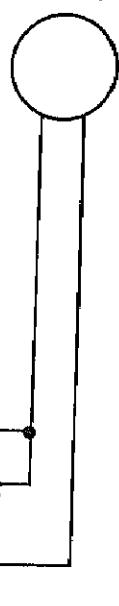
Speaker (left)



Speaker (right)

Suggested uses:

Rules of the Road  
Legal Requirements  
Sailors' Language



Cost: Not submitted.

Submitted by:  
Howard C. Speulda  
Flotilla 52, Napa

## VAPOR CANNON

To forcefully describe the explosiveness of gasoline boating classes for many years have stated that one cupful of gasoline vaporized with sufficient quantities of air is equal to the explosive force of 15 sticks of dynamite.

Words will never leave the student with as lasting an impression as the use of an audible sound device such as a "Vapor Cannon".

This device operates as its name implies. A few drops of isopropyl alcohol are detonated, hurling a large cork the length of a large classroom with great effectiveness, accompanied by a loud pop.

While very effective, it is completely safe to operate providing the muzzle of the cannon is kept well away from the seated students.

To construct the device it is best to first assemble the required items listed below:

- 1 - large 6V. lantern battery(ex. Eveready #731 Heavy Duty)
- 1 - 6V Model T Spark Coil
- 1 - Lawn mower spark plug
- 1 - small grounding strap (such as used on auto heater hoses)
- 1 - cork to fit end of copper tube
- 5 ft. stranded bell hook up wire
- 1 - single pole single throw toggle switch
- 1 - board 6" x 30" long (size is not critical)
- 1 oz. isopropyl alcohol in a dropper bottle.

Note: Model T spark coils (they are all 6 volt) are available on order through many auto supply stores. A firm in Chicago can supply if not available locally.

See accompanying diagram for construction details.

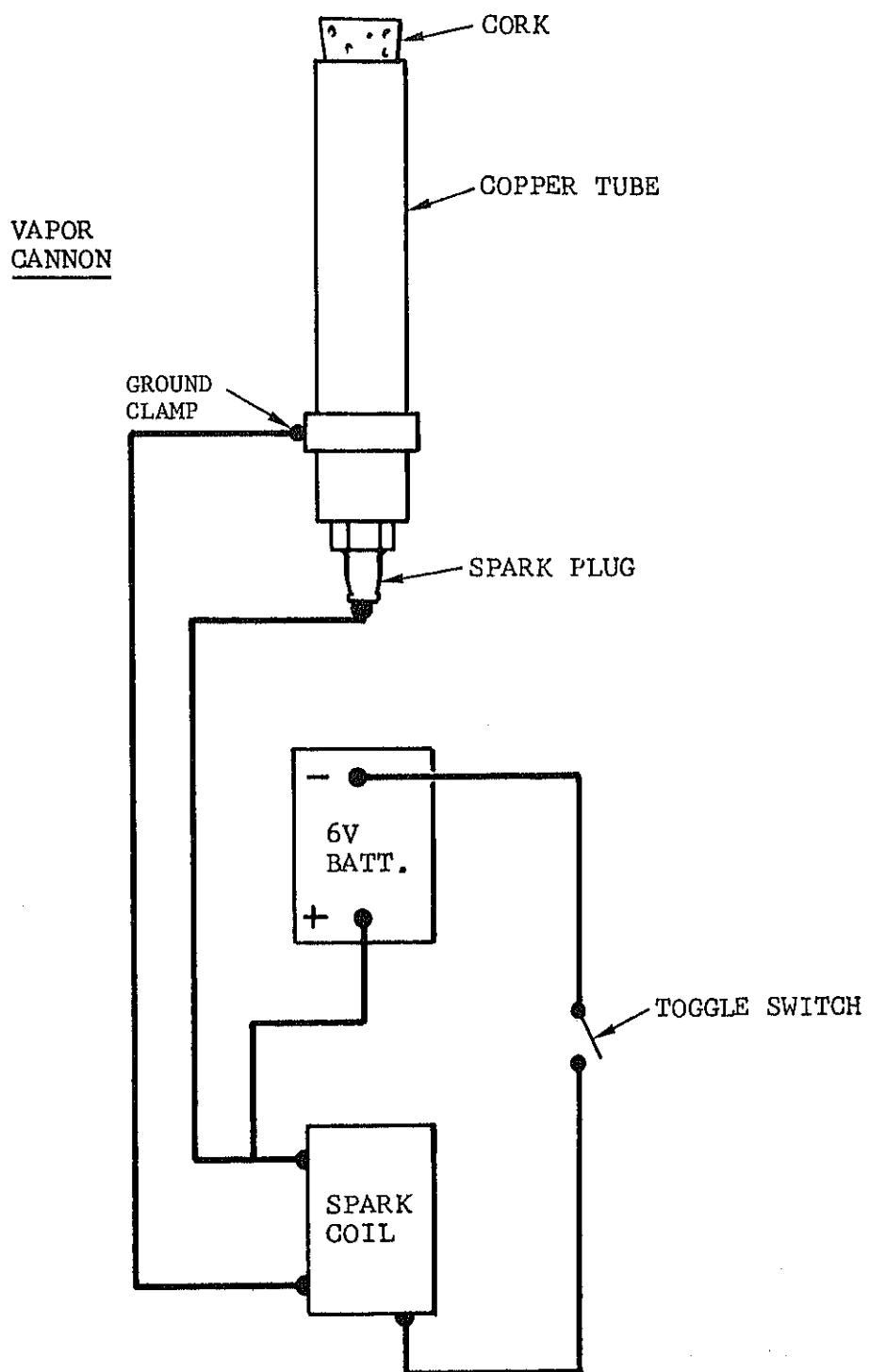
The unit is not difficult to construct. Placement of the units is optional on the base board. Only the proper wiring is critical.

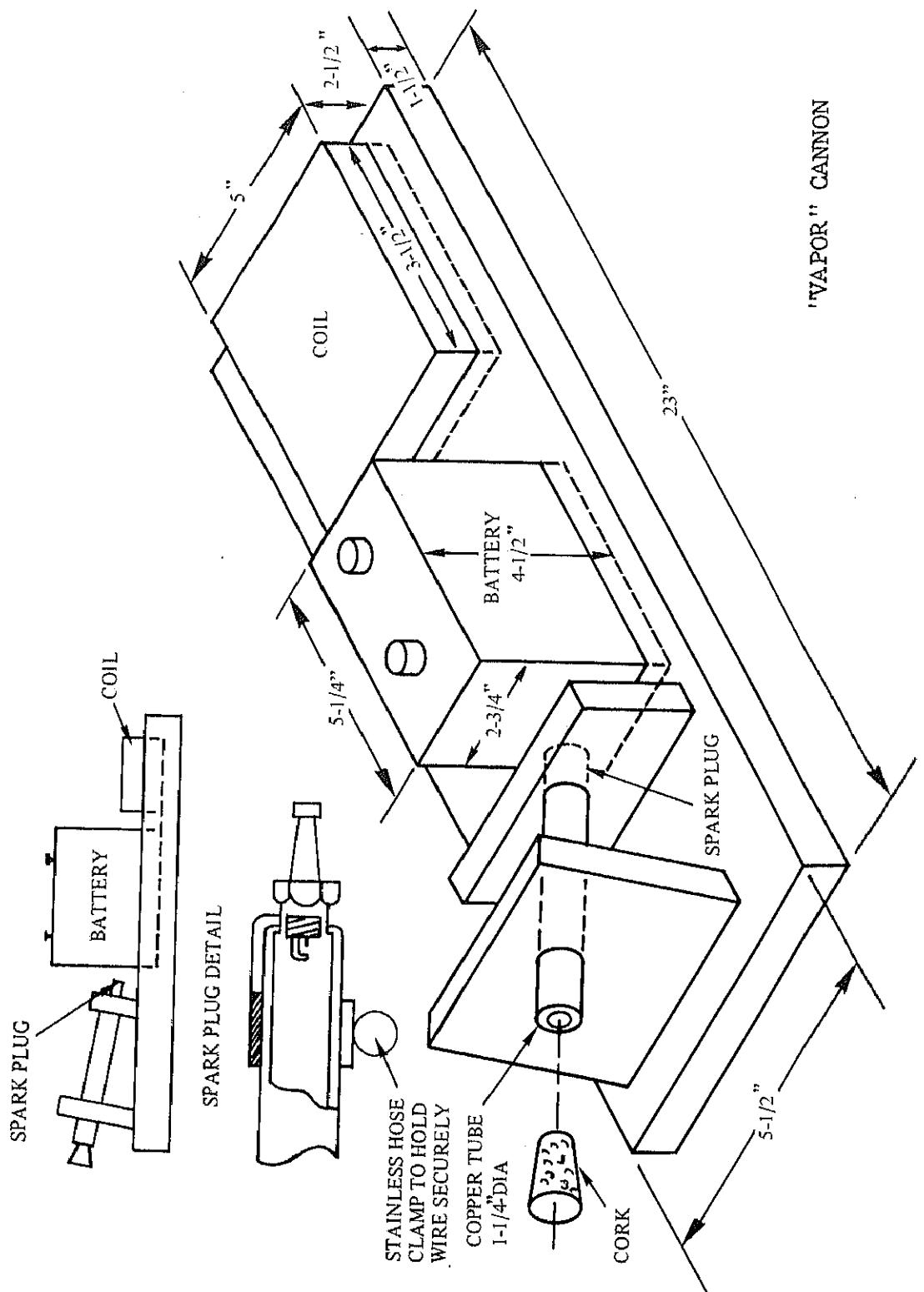
The device costs about \$30.00 to construct. Its effectiveness in use makes it a valuable audio visual aid.

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Submitted by:

Ralph R. Hoffman BC-TSA





HINTS

"During the class on Marlinspike Seamanship. the instructor provided each student with a post-stand and length of rope for practice of tying knots during class period."

R. J (Bob) Leiendoeker PEO  
Flotilla 11-4 So. Lake Tahoe

"A member mentioned that instructors who find it difficult to sketch on a black-board might use a trick employed on T.V.: that is, drawing the subject lightly in pencil before the class arrives as the pencil marks cannot be seen over two or three feet away."

Jack G. Heinen, FSO/MT  
Flotilla 84 San Rafael

\* U. S. GOVERNMENT PRINTING OFFICE: 1977 725-358/774